

NOTES ON SAPINDACEAE, III

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Summary

The genera *Cardiospermum* (2 naturalised species), *Allophylus* (1 species), *Castanospora* (1 species), *Ganophyllum* (1 species), *Lepisanthes* (1 species), *Guioa* (6 species), *Rhysotoechia* (4 species), *Cupaniopsis* (10 species), *Distichostemon* (6 species) and *Sarcopteryx* (5 species) are dealt with. All taxa are described and keys to the species in each genus provided.

Cupaniopsis fleckeri, *C. newmanii*, *Distichostemon arnhemicus*, *D. barklyanus*, *D. hispidulus* var. *aridus*, *Sarcopteryx acuminata*, *S. montana* and *S. reticulata* are described as new. *Cupaniopsis tomentella* is a new combination based on *Cupania tomentella* F. Muell. ex Benth. (syn. *Cupaniopsis serrata* (F. Muell.) Radlk. var. *tomentella* (F. Muell. ex Benth.) Radlk.). *Distichostemon hispidulus* var. *phyllopterus* is a new combination based on *D. phyllopterus* F. Muell.

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CARDIOSPERMUM

Cardiospermum L., Sp. Pl. 366 (1755). **Type species:** *C. halicacabum* L.
Corindum Miller, Gard. Dict. Abr. ed. 4 (1754). **Type:** *C. halicacabum* L.

Climbing herbaceous annuals from perennial rootstock; stems deeply sulcate usually with yellow ribs; petioles, rachises and peduncles also ribbed; indumentum of simple hairs. Leaves biternate; leaflets mostly deeply inciso-pinnatifid, or irregularly serrate. Inflorescences axillary, mostly thyrsoid, long peduncled with 1 or 2 pairs of circinnate tendrils at the tips of primary peduncles, ultimate branches bearing bracteate cincinnate racemes or contracted cirrosed cymules towards their tips. Flowers unisexual, zygomorphic; pedicellate; sepals 4 or 5, free, unequal, paired, outer pair smaller, broadly ovate, flat, inner ones elliptic, concave; petals 4, paired, obovate with cucullate crested or crestless scales; disc unilateral, 4-lobed, 2 inferior ones usually obsolete; stamens 6–8, unilateral, grouped opposite disc; ovaries 3-celled with solitary ovule in each cell; styles short; stigmas with 3 linear lobes. Capsules stalked, subglobose, ellipsoid, or turbinate, inflated; valves membranous, veined; seeds globose, smooth, black, with small, aril at base.

12–20 species, mainly tropical, chiefly America: two naturalised in Australia.

Plants densely hairy. Flowers 8–12 mm long. Capsules 4–8 cm long, ellipsoid. Leaves 7.5–16.5 cm long. Inflorescences corymbiform 1. ***C. grandiflorum***

Plants puberulent or subglabrous. Flowers to 4 mm long. Capsules 1–3 cm long, subglobose or turbinate. Leaves 4–8.5 cm long. Inflorescences with 3 (or 4) ultimate branches clustered on a short stalk 2. ***C. halicacabum***

1. *Cardiospermum grandiflorum* Swartz, Nov. Gen. & Sp. Pl. 64 (1788); Radlk., Pflanzenr., Heft 98b: 372 (1932); C. D. Adams, Flow. Plts Jamaica, 438 (1972). **Type:** Jamaica (not seen).

C. hirsutum Willd., Sp. Pl. ed. 2 (1):467 (1799). **Type:** Guinea (not seen).

C. elegans Kunth in H. B. & K., Nov. Gen. Sp. Pl. 5:99, t.439 (1822). **Type:** South America (not seen).

C. grandiflorum forma *hirsutum* (Willd.) Radlk., Sitzungsber. Bayer. Akad. 8:260 (1878), based on *C. hirsutum* Willd.

C. grandiflorum forma *elegans* (Kunth) Radlk., l.c. (1878) based on *C. elegans* Kunth.

Vine with stem, petioles, rachises and peduncles densely or sparsely rusty-brown hirsute with ± crispate hairs. Leaves with petiole 8.5–24 cm long; petioles 1.6–5 cm, terete; rachises 1.5–3.5 cm long; pinnae 3.5–10.5 × 2.5–12.5 cm; secondary petioles 0.6–1.5 cm; pinnules oblong-ovate or elliptic-ovate, acute or acuminate at tips, margins often irregularly serrate, bases acute, or pinnules abruptly narrowing and decurrent into petiolules, 2.5–8 × 1.3–5 cm, puberulent or lower surfaces pubescent; thinly coriaceous; terminal petiolules 4–6 mm, lateral ones sessile. Panicles corymbiform, 2.5–5.5 cm long and as wide, primary peduncles 5.5–14.5 cm long with a pair of recurved tendrils at base of panicles, secondary peduncles to 1 cm long bearing numerous subulate or scale-like bracts and about 7 flowers in cincinnate racemes at their tips. Flowers white 8–12 mm long; pedicels 5 mm long; outer sepals 2 × 2 mm, inner ones 8.5 × 8 mm; petals 9–11 × 4.5–5 mm, glabrous, scales with crests forming an erect lobe; scales oblong, cucullate, recurved; crests broad truncate; disc with 2 corniform erect lobes; filaments 3–6 mm long, glabrous; ovaries pubescent. Capsules ellipsoid to subovoid, 4–8 × 3–4.5 cm, 6-ribbed, puberulent; seeds 7 × 7 mm; aril white, patelliform. **Fig. 1 E, F, G.**

Native of tropical America, naturalised in central and southern Queensland; usually along river banks.

Queensland. LEICHHARDT DISTRICT: Emerald, Jun 1964, *Bisset* E373. WIDE BAY DISTRICT: Gympie district, Dec 1956, *Thoroughgood*. BURNETT DISTRICT: Bank of Burnett River at Gayndah, Jul 1970, *Durrington* 111. MORETON DISTRICT: River-view, 15 km E of Ipswich, Apr 1976, *Pedley* 4273; Wivenhoe Bridge over Brisbane River, 16 km south of Esk, May 1973, *Sharpe* 477; Numinbah Valley via Nerang, Jun 1960, *Marshall*.

Common name: Heart-seed Vine.

2. *Cardiospermum halicacabum* L., Sp. Pl. ed. 1, 366 (1753); Benth., Fl. Aust. 1:453 (1863); F. M. Bailey, Qd Fl. 1:286 (1899); Radlk., Pflanzenr., Heft 98b:379, t.8 (1932). **Type:** East Indies (not seen).

C. microcarpum Kunth in H. B. & K., Nov. Gen. & Sp. Pl. 5:104 (1821); C. D. Adams, Flow. Plts Jamaica, 438 (1972). **Type:** Province of Orinoco, South America (not seen).

Slender vines with stems, petioles, rachises and peduncles usually sparsely hairy with pale curved hairs. Leaves with petioles 6–14 cm long; petioles 1.4–5.5 cm; rachises 1–2.5 cm; rachises and petioles often narrowly winged; pinnae 2.5–6.5 × 2–7 cm; secondary petioles 0.5–1 cm; pinnales ovate-oblong, apices acuminate or acute, margins irregularly dentate or deeply incise-pinnatifid, bases attenuate, decurrent into petiolules, 1.5–3.5 × 0.7–1.8 cm, puberulent especially on the veins or glabrous; terminal petiolules 5–7 mm long, laterals 2–4 mm. Inflorescences complex, with 3 (or 4) ultimate branches clustered on a short stalk (stalks 4–6 mm long); branches 0.5–2.5 cm long bearing densely bracteate contracted cincinnate racemes or cirroscymules at their tips, abortively 3–5-flowered; primary peduncles 2.5–14 cm long with 1 or 2 pairs of tendrils. Flowers white, 4 mm diam.; pedicels 2–3 mm long; outer sepals 1–1.5 mm long and as wide; inner ones 3–4 × 1.5–2 mm; petals 3 × 1.5 mm, only posterior pair with scales and crests; scales oblong, cucullate, puberulent; crests obovate; disc small, tumid; filaments to 2.5 mm long, pilose; ovaries pubescent. Capsules subglobose or turbinate, 1–3 cm long and in diam.; pubescent or puberulent; seeds 3–5 mm diam. with small, white, 2-lobed aril.

Common, usually as a weed in warm countries.

Two varieties in Australia:—

Capsules subglobose, 2.5–3 cm long and diam.; seeds with small cordate aril. Leaves with petiole 6.5–14 cm long var. **halicacabum**

Capsules turbinate, to 1 × 2 cm; seeds with small, broadly 2-lobed aril. Leaves with petiole 6–8.5 cm long var. **microcarpum**

2a. *Cardiospermum halicacabum* var. **halicacabum**

Queensland and Northern Territory, usually as a weed in gardens.

Northern Territory. Near Wavehill P.S., Jun 1949, *Perry* 2243. **Queensland.** COOK DISTRICT: Mitchell R. Mission near mouth of Mitchell River, *Whitehouse*. BURKE DISTRICT: Flinders River, Aug 1916, *White*; Bundoan, S of Nonda, Jun 1947, *Everist* 3019. NORTH KENNEDY DISTRICT: Kelsey Creek, near Proserpine, *Michael*. PORT CURTIS DISTRICT: Queen's Park, Rockhampton, Mar 1920, *Francis*. WIDE BAY DISTRICT: Bundaberg, *Shirley*. BURNETT DISTRICT: Philpott Creek, Mundubberra, Jun 1942, *Miller*.

2b. *Cardiospermum halicacabum* var. **microcarpum** (Kunth) Blume, Rumphia 3:185. (1847); Radlk., Pflanzenr., Heft 98b:387 (1932). Based on *C. microcarpum* Kunth in H. B. & K., Nov. Gen. & Sp. Pl. 5:104 (1821). **Type:** Province of Orinoco, South America (not seen).

C. truncatum A. Rich., Tent. Fl. Abyss. 1:101 (1847), **Type:** Ethiopia (not seen).

Queensland. BURNETT DISTRICT: Barambah Creek, approx. 65 km NE of Gayndah, Jun 1970, *Lebler & Durrington* 30.

ALLOPHYLUS

Allophylus L., Fl. Zeyl. 58, n 140 (1747) & Sp. Pl. 348 (1753); Radlk., Pflanzenr. Heft. 98b:455 (1932); Backer & Bakh. f., Fl. Java 2:133 (1965); Leenh., Blumea 15(2):301–358 (1967). **Type:** *A. zeylanicus* L.

Schmidelia L., Mant. 1:10, 67 (1767); Benth., Fl. Aust. 1:455 (1863); F. M. Bailey, Qd Fl. 1:288 (1899). **Type:** *S. racemosa* L.

Aporetica J. R. & J. G. Forster, Char. Gen. Pl. 131, t.66 (1776). **Type:** *A. ternata* J. R. & J. G. Forster.

Erect or subscaudent shrubs; indumentum of simple hairs. Leaves palmately 1–5-foliolate, mostly trifoliolate; leaflets with serrate to subentire margins. Inflorescences axillary, usually solitary in each axil, thysoid, spiciform with fascicles of flowers, rarely branched. Flowers small, irregular, unisexual; pedicellate; sepals 4, paired, broadly imbricate, unequal, outer pair smaller; elliptic to suborbicular, concave; petals 4, unilateral, long clawed; scales 2-lobed, reflexed, crestless; disc unilateral, either 4-lobed or with 2–4 glands; stamens excentric, opposite disc; ovaries deeply 2–(or 3-) lobed, segments 1-celled, 1-ovuled; styles filiform; stigmas 2-lobed. Fruits mostly 1-lobed with aborted lobes towards base, coccus indehiscent, drupaceous or almost dry; seeds obovoid, exarillate.

Only one extremely variable species which has been described under many different names, (Backer & Bakh. f. *l.c.* 1965 & Leenhouts *l.c.* 1967). Tropical and subtropical Africa, Asia, New Guinea and northern Australia.

Allophylus cobbe (L.) Rauschel, Nomencl. ed. 3, 108 (1797); Radlk., *l.c.* 594 (1932); Leenh., *l.c.* 322 (1967). Based on *Rhus cobbe* L., Sp. Pl. 1:267 (1753). **Type:** Ceylon (not seen).

Small scandent shrubs; young parts and peduncles pubescent; branchlets pubescent or puberulent with very short usually antrorse hairs; lenticellate. Leaves trifoliolate; petioles 2.5–7.5 cm long, terete or semiterete, pubescent or glabrous; pinnae ovate, elliptic or elliptic-ovate, subrhomboidal or obovate, apices acute, acuminate or obtuse, margins irregularly crenulate or serrulate, subentire or entire, bases truncate, rounded, obtuse, or cuneate and decurrent, lateral leaflets often with oblique bases, 4–13.5 × 2–7.5 cm, glabrous or puberulent especially on the nerves, semicoriaceous, usually with minute dots; lateral nerves 7–10 pairs, subpatent, slender, mostly with hairy tufts in their axils below; petiolules 1–10 mm long (terminal one the longest), bisulcate, pubescent. Panicles 1.5–13.5 cm long, spiciform, usually with scattered clusters of 2–7-flowered subsessile cymules. Flowers about 2.5 mm diam., greenish white; pedicels 1–2 mm long; sepals 1–2 × 0.5–1.5 mm, elliptic to suborbicular, concave, membranous, gland-dotted, ciliolate, puberulent or glabrous; petals 1.5–2 × 0.5 mm, spatulate with long tubular claw, emarginate or dentate at apex, glabrous except scale; filaments 1–2 mm long, filiform, subglabrous, exerted; ovaries 2-lobed, lobes suborbicular, villous; Fruits 5–6 × 4–5 mm, subglobose to ellipsoid, bright red, ± glabrous. **Fig. 1 A, B, C, D.**

Northern Queensland and Northern Territory, edge of mangroves along sea shores, or on sandstone hills.

Northern Territory. East Point (12°25'S, 130°50'E), Feb 1974, *Must* 1184; Buffalo Creek, Darwin, Feb 1971, *Byrnes* 2063. **Queensland.** COOK DISTRICT: Saibai (9°30'S, 142°40'E), Jul 1973, *Stocker* 1408; Port Douglas, Jan 1932, *Brass* 1913; Daintree near McDowell's Crossing, Nov 1973, *Dockrill* 792. NORTH KENNEDY DISTRICT: Portion 39, Parish of Meunga about 4 km N of Cardwell, Jan 1975, *Thorsborne*.

GANOPHYLLUM

Ganophyllum Blume, Mus. Bot. Lug.-Bat. 1:230 (1850). **Type:** *G. falcatum* Blume

Trees; branchlets, leaves and peduncles resinous with fine peltate scales, glabrous. Leaves paripinnate; pinnae alternate, subfalcate, entire; shortly petiolulate. Inflorescences in upper axils, thyrroid, paniculate or racemiform, polygamo-dioecious. Flowers small, regular; pedicellate; calyces cupular, 5(–7)-toothed, lobes ovate, subvalvate, coriaceous; petals absent; disc regular; stamens 5(–7), glabrous; ovaries sessile, 2-locular with 2 ovules in each cell; styles short, stigmas 2-fid. Fruits drupaceous, small, 1-celled, 1- or 2-seeded; seeds exarillate; testa thinly crustaceous; embryo pale green.

One species, tropical West Africa, Andaman Island, Philippines, Malaysia, Indonesia, New Guinea and Australia.

Ganophyllum falcatum Blume, *l.c.* 230 (1850); F. Muell., *Fragm.* 7:24 (1869); F. M. Bailey, *Qd Fl.* 1:225 (1899). **Type:** New Guinea (not seen).

Trees to 32 m; bark coarse, flakey; branchlets angular, resinous towards tip, lenticellate. Leaves with petiole (18–)24–44 cm long, with 5–10 leaflets on each side of rachis; petioles 4.5–6.5 cm long, subterete, ± grooved above, pulvinate and broad at base; rachises

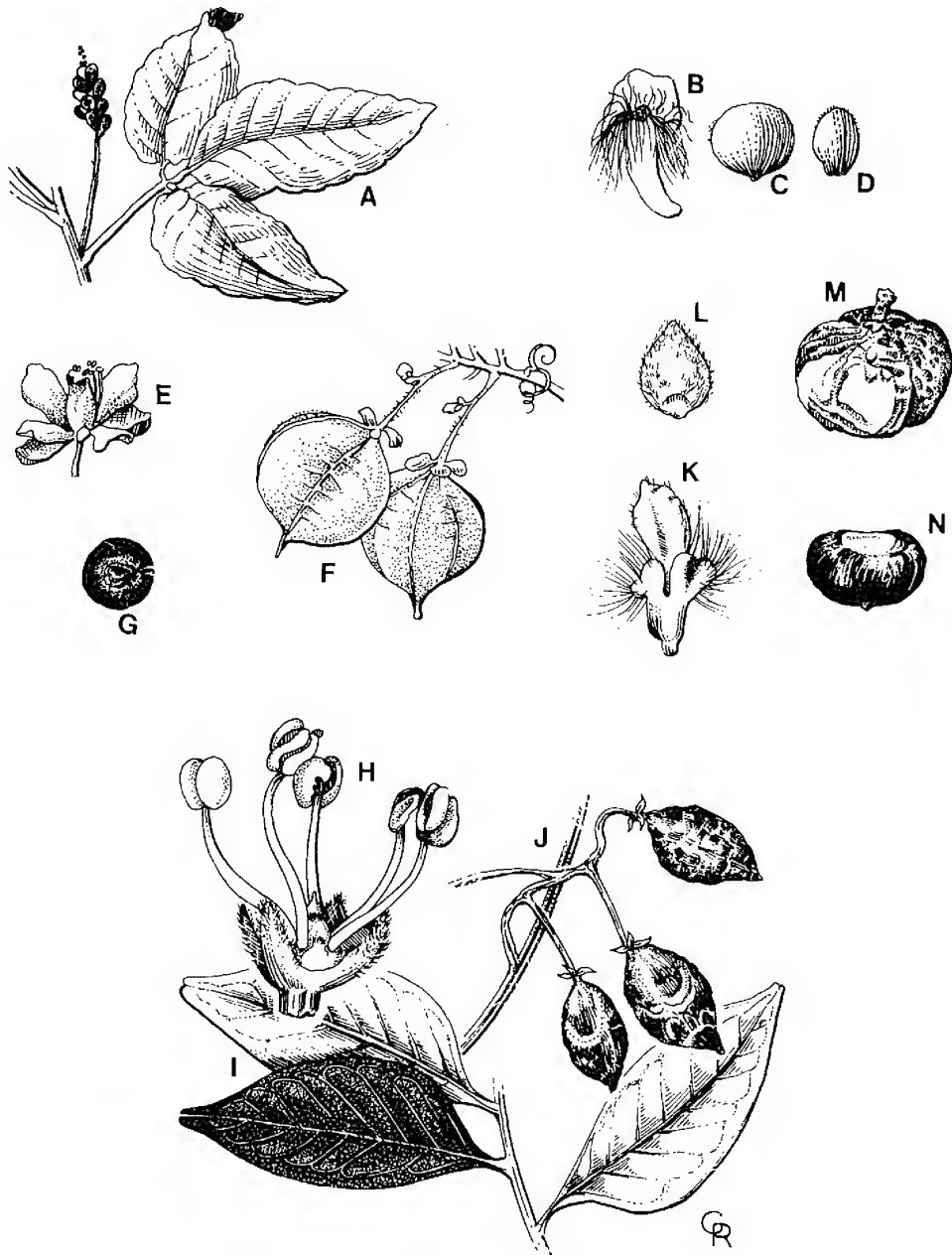


Fig. 1. *Allophylus cobbe*: A. fruiting branchlets ($\times \frac{1}{4}$), B. petal ($\times 12$), C. outer sepal ($\times 6$), D. inner sepal ($\times 6$). *Cardiospermum grandiflorum*: E. flower ($\times 1$), F. fruits ($\times \frac{1}{2}$), G. seed ($\times 1$). *Ganophyllum falcatum*: H. flower ($\times 6$), I. leaflets ($\times \frac{1}{2}$), J. fruits ($\times 1$). *Castanospora alphandi*: K. petal ($\times 12$), L. sepal ($\times 6$), M. fruit ($\times \frac{3}{4}$), N. seed ($\times \frac{3}{4}$).

(5-)12-19(-25) cm, subterete, broadly channelled above, resinous scaly; pinnae obliquely ovate to ovate oblong, subfalcate, attenuate or shortly and obtusely acuminate or subcaudate at apices, margins entire, bases oblique (subtruncate and rounded in upper half, acute in lower) narrowing into petiolules, 2.8-9.5(-15) × 1.3-5(-7) cm, coriaceous, pellucid punctate, shiny above and finely and minutely white resinous scaly; midrib excentric; lateral nerves subpatent, looping away from margins; petiolules 3-4 mm. Inflorescences solitary; male panicles 10-28 × 4.5-18.5 cm, copiously flowered; females 10-24 × 3-9 cm; bracts small, ovate, glabrous. Flowers whitish, about 3.5 mm diam.; pedicels to 2 mm long; calyces 3.5 × 2 mm, lobes 1.2 × 1 mm, puberulent inside, glabrous outside; resin-dotted; disc small, puberulent; filaments exerted, to 3.5 mm long, filiform; anthers ellipsoid, to 1 mm long; ovaries ovoid. Drupes red, 1.2-1.5 × 0.6-0.8 cm, ellipsoid-ovoid, acute, apiculate (residual style), glabrous.

Mostly in northern Australia extending to as far as Central Queensland, chiefly coastal and quite common on the offshore islands. In moonsoon forests and edge of mangrove swamps. **Fig. 1 H, I, J.**

Philippines: Province of Bulacan, Luzon, Dec 1914, *Ramos*. **New Guinea,** NORTHERN DISTRICT: Near Koreaf village, Tufi sub-district, Oct 1954, *Hoogland* 4839. CENTRAL DISTRICT: Kubuna, Nov 1933, *Brass* 5619; Brown River Forest Reserve (9°15'S, 147°20'E), Jan 1960, *McDonald* (NGF 9233). MOROBE DISTRICT: Nadzab area, Dec 1944, *Smith* (NGF 1167). WESTERN DISTRICT: Gaima, Lower Fly River, east bank, Nov 1936, *Brass* 8336. **Australia.** **Western Australia:** S.E. of Cape Londonberry, N. Kimberley (± 13°53'S, 127°04'E), Aug 1975, *George* 13350; Mitchell Plateau, N.W. Kimberley (14°40'S, 125°45'E), Feb 1974, *Kenneally* 7100. **Northern Territory:** Melville Island, May 1966, *Stocker*; East Point, Darwin, Dec 1968, *Byrnes* 286. **Queensland:** COOK DISTRICT: Thursday Island, in 1962, *Webb & Tracey* 7886; Iron Range, Jul 1972, *Hyland* 2591; Lizard Island, May 1975, *Byrnes* 3256; Two Isles, Sep 1973, *Stoddart* 4621; Little Mulgrave (17°05'S, 145°40'E), Dec 1976, *Hyland* 9259; Yarrabah, *Michael*. NORTH KENNEDY DISTRICT: Jarra Creek near Tully, Sep 1950, *Webb* 2359; Palm Island, *Bancroft*; Conway State Forest, between Airlie and Shute Harbour, Jun 1965, *Smith & Tracey* 7614. SOUTH KENNEDY DISTRICT: R. 60 Ossa, Cape Hillsborough, May 1975, *Hyland* 8225. PORT CURTIS DISTRICT: Eurumbula Holding between Eurumbula and Middle Creeks, E of Miriam Vale, Dec 1970, *Webb & Tracey* 10350.

CASTANOSPORA

Castanospora F. Muell., *Fragm.* 9:92 (1875). **Type:** *C. alphandi* (F. Muell.) F. Muell., based on *Ratonia alphandi* F. Muell.

Trees; branchlets densely hairy; indumentum of simple hairs. Leaves long petiolate, paripinnate; leaflets alternate or subopposite, entire; petiolules long pulvinate. Inflorescences axillary, thyrsiform panicles with divaricate branches; bracteate. Flowers regular, small, unisexual and probably monoecious; calyces shortly cupuliform, 5-partite, lobes ovate, subvalvate; petals 5, shortly clawed, with 2 crestless scales inside; disc cupular; stamens 8, filaments densely villous; ovaries 2-locular, ovules solitary in each cell; style short, stigma 2-lobed. Fruits large, drupaceous, 2-celled, septa thin or none; pericarp fleshy, rugose, ± crustaceous, indehiscent; seeds large, chestnut-like, exarillate.

One species endemic to warmer parts of Eastern Australia.

Castanospora alphandi (F. Muell.) F. Muell., *Fragm.* 9:92 (1875); F. M. Bailey, *Qd Fl.* 1:287 (1899); Francis, *Aust. Rain-For. trees*, ed. 3.248 (1970). Based on *Ratonia alphandi* F. Muell., *Fragm.* 4:158 (1864). **Type:** Seaview Range, near Rockingham Bay, *Dallachy* (not seen).

Cupania alphandi F. Muell. l.c. 158 (1864) *pro syn.*

Glenniea alphandi F. Muell., l.c. 92 (1875) *pro syn.*

Nephelium callarrie J. F. Bailey, *Qd Agric. J.* 5:396 (Oct 1899); F. M. Bailey, *Qd Fl.* 1:306 (Dec 1899). **Type:** Upper Barron River, June 1899, *J. F. Bailey* (BRI, holo).

Trees usually tall and spreading, to 35 m high, 50 cm girth, sometimes buttressed; young parts, branchlets and inflorescences with thick short pale brown appressed pubescence; others more or less puberulous; lenticels small, rusty, dense on branchlets, often present on petioles, rachises and peduncles. Leaves with petiole 27-42(-51) cm long with (3-)4-6(-7) leaflets each side of rachis;

petioles 8–19 cm long, ± subterete, trisulcate at base; rachises (7–)15–23(–30) cm long, subterete; pinnae narrowly elliptic-oblong to elliptic-ovate-oblong, acute or acuminate at apices, subacute at base, 9–17.5(–22) × 3–6(–8) cm, upper surfaces glabrous, lower ones whitish, papillose, pubescent to puberulent; midribs grooved above, raised and ridged below; prominently and closely nerved with fine lateral nerves and dense reticulation; lateral nerves 20–26 pairs, subpatent, sometimes with domatia in their axils below; petiolules 0.8–1.2 cm long, grooved above, pubescent. Panicles 13–27 cm long and to 18 cm wide, densely flowered; primary peduncles broad at base; cymules stalked, 3–7-flowered; bracts small, ovate, pubescent outside. Flowers 3–4.5 mm diam., whitish, scented; pedicels 1.5–3 mm long (shorter in females), articulate near base, pubescent; calyces 2 × 2.5–4.5 mm, lobes 1.5 × 1 mm, coriaceous, pubescent outside with appressed pale rusty hairs, puberulent inside; petals obtrullate, about 2 × 1 mm, puberulent to subglabrous; scales acute, inflexed, hairy; disc cupular, ± lobed, hairy on margins; filaments exerted, 2–3 mm long, subulate, densely villous, anthers 1 mm long, ovoid; ovaries pubescent. Fruits depressed subglobose to transversely ellipsoid or ovoid, 2.5–3 × 3–5.8 cm, usually indistinctly 2–4-sulcate, reddish brown or peach, finely tomentose on outside; seeds 2, about 1.7 × 2.2 cm, subglobose or chesnut-like, brown; stipe short. **Fig. 1 K, L, M, N.**

Chiefly coastal from northern Queensland to Bellinger River, New South Wales; mostly along creek banks in remnant rainforests.

Queensland. COOK DISTRICT: Daintree, Jul 1943, *Blake* 14998; S.F.R. 310, Windin L.A. (Windin Ck, a trib. of Mulgrave River, 17°20'S, 145°45'E), May 1971, *Dockrill* 67. NORTH KENNEDY DISTRICT: Ravenshoe, Apr 1922, *Manually*; about 56 km N of Cape River, on Clermont-Charters Towers Road, Aug 1947, *Smith* 3195. WIDE BAY DISTRICT: Pinbarren Creek beside Pomona-Kin Kin Road, Nov 1975, *Loch*. BURNETT DISTRICT: Head of Burnett River, *Shirley*. MORETON DISTRICT: Blackall Range, *Keys*; Tallebudgera Creek, E of junction with Cougall Creek, Apr 1977, *McDonald* 1810. **New South Wales.** Alstonville, Jun 1908, *Tomlins*.

LEPISANTHES

Lepisanthes Blume, *Bijdr.* 1:237 (1825). **Type:** *L. montana* Blume
Erioglossum Blume, *Bijdr.* 1:229 (1825). **Type:** *E. edule* Blume

Shrubs or trees. Leaves paripinnate, pinnae opposite or alternate, entire. Inflorescences terminal or in upper axils, paniculiform often combined into terminal panicles; bracteate. Buds globose. Flowers usually fasciated, zygomorphic; sepals 5, broadly imbricate, unequal, outer pair smaller; petals 4, longer than sepals, obovate, shortly clawed, scales shorter than petal, extended into 2 lobes or in a broad fringed erect crest; disc interrupted (or one-sided) with 3 prominent angles, glabrous; stamens 8, filaments pilose; ovaries 3-lobed, segments 1-celled, 1-ovuled; styles slender, curved, hairy, persistent; stigma indistinctly lobed. Fruit obcordate, tricoccus (or not lobed), cohering at base with a shortened stipe, lobes oblongoid or ellipsoid, succulent, subglabrous, indehiscent; seeds exarillate.

Large genus of Old World tropics, West Africa, southern and southeastern Asia (to Hainan) Malesia and Australia; only one species in Australia.

Lepisanthes rubiginosa (Roxb.) Leenh., *Blumea* 17:82 (1969). Based on *Sapindus rubiginosa* Roxb., *Pl. Corom.* 1:44. t.62 (1795). **Type:** India, Coast of Coromandel (not seen).

Pancovia rubiginosa F. Muell., *Fragm.* 9:100 (1875). Based on *Sapindus rubiginosa* Roxb.

Erioglossum edule Blume, *Bijdr.* 1:229 (1825) & *Rumphia* 3:119, t.166 (1849). Based on *Sapindus edulis* Blume, *Cat. Hort. Buitenz.* 64 (1823) nom. illeg. **Type:** Java (not seen).

Small trees to 10 m; young parts, branchlets, petioles, rachises, petiolules and peduncles densely brown tomentose with ± crispate hairs; branchlets ribbed. Leaves with petiole (8–)20–60 cm long with 2–5(–9) leaflets each side of rachis; petioles 5–14 cm long, terete; rachises 10–36 cm long, terete; pinnae elliptic-oblong or ovate-oblong, tips usually broad, obtuse, or slightly retuse to subacute, bases oblique, obtuse, truncate, rarely unequal, 3–24 × 3–6 cm, lowermost pair the smallest, both surfaces with brown pubescence or puberulence especially on the nerves, or subglabrous above except the nerves, papillose below; lateral nerves 8–16 pairs, suboblique, parallel, raised below; petiolules 2–5 mm, terete. Panicles 10–35 cm long and nearly as wide, laxly branched, densely flowered, cymules 3–8-flowered; bracts subulate, 1.5–2.5 × 0.5–1 mm,

tomentose. Flowers white, to 6 mm diam.; pedicels 1–5 mm, articulate at middle; sepals ovate-orbicular, 3–4 × 1.5–4 mm, concave, glabrous inside, densely sericeous on outside except membranous, glabrous margin; petals white, 5–6 × 3–4 mm, obovate-oblong, abruptly narrowed into short claw, glabrous outside, margins crispate; scale elongate, narrow oblong, inflexed, glabrous except the densely long hairy fringe at the recurved apex just below the 2 linear crests; stamens 7–8, subexcentric, usually at opening of interrupted 3-lobed, glabrous disc; filaments 3–5 mm long, filiform, densely hairy. Fruits not seen in Australian material.

Philippines, Indonesia, Malaysia, New Guinea and Western Australia. In deciduous vine scrubs or border of light rainforests.

Western Australia: Mt Trafalgar, Prince Regent River Reserve (15°17'S, 125°04'E), Aug 1974, *George* 12642 (PERTH); Python Cliffs (15°20'S, 124°56'E), Prince Regent River Reserve, Aug 1974, *Kenneally* 2144 (PERTH).

GUIOA

Guioa Cav., *Icon* 4:49, t. 373 (1797). **Type:** *G. lentiscifolia* Cav.

Trees; indumentum of single hairs. Leaves paripinnate; leaflets entire or crenulate-serrulate at margins, usually pellucid punctate. Inflorescences thyrsoid, usually slender, in the axil of leaves or fallen leaves or ramiflorous and clustered on short branchlets; cymules stalked; bracteate. Flowers unisexual, mostly monocious, small, slightly irregular; pedicels articulate towards base; calyces 5-sect, lobes 2-seriate, unequal, broadly imbricate, ± suborbicular concave, coriaceous and gland-dotted towards centre, margins pale, thin, ciliolate; petals 5, mostly narrowly subobovate with short slender claw, scales 2-lobed slender, oblong, puberulent, usually crested; disc fleshy, glabrous, complete or incomplete; stamens 6–8, filaments usually hairy; ovaries triquetrous, 3-locular with solitary ovule in each cell; styles filiform, terminal, stigma 3-lobed. Capsules broadly obcordate, deeply 3-lobed, apiculate (residual style); lobes divaricate, wing-like, compressed and thickened at margins, mostly drying black; loculicidally 2-valved; valves thick, glabrous, spreading after dehiscence; seeds ellipsoid, nearly covered by thin, tailed aril.

Eighty species, Indo-Malaysia, Pacific, New Guinea and Australia; 6 in eastern Australia.

1. Leaflets 6–9– paired; margins crenulate-serrulate 1. *G. crenifoliola*
 Leaflets 1–4– paired; margins entire 2
2. Indumentum on branchlets, petioles, rachises, peduncles and nerves of leaflets of
 ferruginous, hirsute spreading hairs 2. *G. lasioneura*
 Indumentum if present of fine short appressed hairs 3
3. Rachises broad and somewhat flattened and mostly dilated between each pair of
 leaflets; pinnae 1–4– paired, 4–6 × 1.2–2.2 cm. Capsules 1.2–2 × 2.6–3.2 cm
 4. *G. coriacea*
 Rachises subterete, not as above; pinnae 1–3(–4)– paired, 4.5–17.5(–19) ×
 1.5–6.5
 cm. Capsules 0.6–1.6 × 1–2.5 cm 4
4. Leaflets with a prominent solitary domatia towards the base. Pinnae 1–3(–4)–
 paired, 5.5–17.5(–19) × 1.8–6 cm, tips acuminate or acute; lower surfaces rarely
 slightly glaucous (usually only when dry). Inflorescences usually clustered on short
 lateral branches in axil of leaves or fallen leaves 3. *G. acutifolia*
 Leaflets without domatias or foveolules. Pinnae 1–2– paired, 4–10 × 1.5–3.8 cm,
 tips obtuse, rounded or acuminate, apiculate, lower surfaces usually semi-
 glaucous, (glaucous when dry). Inflorescences usually solitary in each axil 5
5. Leaflets obovate or elliptic with rounded, obtuse tips, margins flat; semicoriaceous.
 Flowers 4 mm diam. Capsules 0.6–0.8 × 1–1.3 cm 5. *G. semiglauca*
 Leaflets elliptic or elliptic-oblong, acuminate or acute at both ends; margins recurved;
 thickly coriaceous and subrigid. Flowers 6 mm diam. Capsules 1.2–1.6 ×
 2.2–2.5 cm 6. *G. montana*

1. *Guioa crenifoliola* Merr. & Perry, J. Arnold Abor. 21:514 (1940). Type: New Guinea: Bernhard Camp, Idenburg River, Mar 1939, *L. J. Brass* 13082 (BRI iso).

Trees to 18 m high, 20 cm girth; glabrous, except sometimes puberulous young parts. Leaves with 6–9 pairs of opposite or subopposite leaflets; petioles 3.5–4 cm long, terete, pulvinate at base; rachises 5.5–17 cm long, semiterete, slightly margined between each pair of leaflets, bisulcate; pinnae obliquely elliptic-oblong or subovate-oblong, subfalcate, tips acuminate, mostly abruptly and shortly acuminate, margins crenulate-serrulate, bases unequal (usually abruptly obtuse or somewhat truncate on one side and acute or cuneate on the other side of the excentric midrib), narrowing and decurrent into short petiolules, 2.8–6.3 × 1–1.9 cm, coriaceous; lateral nerves 7–10 pairs, subpatent, fine, with prominent solitary domatia towards the base; petiolules 1–3 mm long. Flowers and fruits not seen in Australian specimens. **Fig. 2 K, L.**

New Guinea and northern Queensland. In rainforests, altitude 660–850 m, on Windsor Tableland.

New Guinea: Bernard Camp, Idenburg River, Mar 1939, *Brass* 13703. **Queensland:** COOK DISTRICT: T. R. 146 Tableland L.A., (15° 45'S, 145° 15'E), Jul 1975 *Hyland* 3219; Windsor Tableland NE of Mt Carbine, Jun 1969, *Hyland* 3211.

This is a new record of the species for Australia.

2. *Guioa lasioneura* Radlk., Sitzungsber. Bayer. Akad. 9:608 (1879); Domin, Biblioth. Bot. 89:903 (1927). Type: Rockingham Bay, *Dallachy* (not seen).

Small trees to 15 m high, 20 cm girth, often buttressed; young parts, branchlets, petioles, rachises, petiolules and peduncles densely pubescent with ferruginous, hirsute, spreading hairs. Leaves with 1–2 pairs of opposite or subopposite leaflets; petioles and rachises terete, petioles 1–4(–9) cm long, pulvinate; rachises 1–3.5 cm long; pinnae elliptic to elliptic-ovate or subobovate, tips acute or acuminate, margins entire slightly recurved, bases acute and decurrent into petiolules, 3.5–12.5 × 1.5–4.2 cm (juvenile leaves with leaflets to 16.5 × 8.5 cm; rachises 5.5–13 cm long), thinly coriaceous, glabrous above, pubescent especially on the nerves below, lower surfaces semiglaucous; lateral nerves 6–10 pairs arched and ascending, usually impressed above, sometimes with foveolules in their axils below; petiolules 2–5 mm long, pulvinate. Inflorescences mostly 2 or 3 together in the axil of leaves or fallen leaves, slender, laxly branched and flowered, 1.2–10.5 cm long and to 3 cm wide, peduncles very slender; cymules stalked 3–5-flowered; bracts ovate-subulate to 2 mm long, hirsute. Flowers white, fragile, 3–4 mm diam.; pedicels 2 mm long, fragile, hirsute; calyx lobes broadly elliptic, 1.5–2.5 × 1–2 mm, pubescent to puberulent; petals subobovate 1.5 × 1 mm, shortly clawed, scales nearly as long as petals, hairy; crests thin, stipitate; disc unilateral; filaments 3 mm long, pilose. Capsules obcordate, turbinate and attenuate at base, 0.8–1.4 × 1–2.2 cm, pinkish purple. **Fig. 2 M, N.**

Northern Queensland, on mountain ranges chiefly around the Atherton Tableland, in remnant rainforests between 500–1000 m altitude.

COOK DISTRICT: McDowall Range between Daintree R and Bloomfield R., (16° 05'S, 145° 15'E), Aug 1972, *Webb & Tracey* 10852; Copper Lode Falls Dam site on Freshwater Ck approximately 10 km S of Cairns, Sep 1970, *Gittins* 2203; Portion 92, Parish of Malanda, Dec 1972, *Stocker* 959; Gadgarra & Gurka Pocket, Sep 1957, *Smith* 10142.

3. *Guioa acutifolia* (F. Muell.) Radlk., Sitzungsber. Bayer. Akad. 9:608 (1879); Domin, Biblioth. Bot. 89:903 (1927). Based on *Cupania semiglauca* var. *acutifolia* F. Muell., *Fragm.* 9:98 (1875). Type: Port Dennison, *E. Fitzalan*; Rockingham Bay, *J. Dallachy*; Mossman River, *W. Hill* (syntypes not seen).

Nephelium winterianum Bailey, Qd Agr. J. 3:283 (1898). **Type:** Mt Trafalgar, New Guinea, *F. M. Bailey* (BRI, holo).

Trees to 20 m high, 15 cm girth; bark smooth, grey; glabrous except puberulent inflorescences. Leaves with 1–3(–4) leaflets each side of rachis; petioles 1.2–3 cm long, semiterete, pulvinate; rachises 2.5–9 cm long, subterete; pinnae opposite to alternate, narrowly elliptic-oblong to subovate-elliptic, somewhat falcate, apices acute or acuminate, margins entire, bases acute, obtuse, oblique, decurrent into petiolules, 5.5–17.5(–19) × 1.8–6.5 cm, glabrous, rarely slightly subglaucous below (usually only when dry), lateral nerves 6–12 pairs, subpatent, usually

looping near margins, with prominent solitary domatia towards the base; petiolules 3–10 mm long, semiterete, pulvinate. Inflorescences slender, laxly flowered, branched or unbranched, 2.5–14 cm long and to 10 cm wide, usually 3–5 in a cluster on short branchlets in the axil of leaves or fallen leaves or ramiflorous, rarely subterminal, peduncles slender, puberulent; cymules stalked, 3–5-flowered. Flowers cream with pinkish tint, fragrant, about 3.5 mm diam.; pedicels 2–2.5 mm long, glabrous; calyx lobes 1.5–2.5 × 1.2 mm, broadly elliptic or suborbicular; petals minute, 0.7–1 × 0.5 mm, obovate; scales half as long, bilobed, slender or rudimentary, puberulent, crestless; discs complete or incomplete; filaments 2–3.5 mm long, pilose; ovaries puberulent on the angles only; style filiform. Capsules broadly obcordate, 1–1.2 × 1–2.2 cm, pale yellow or reddish. **Fig. 2 A.**

Australia and New Guinea. Chiefly coastal Queensland, along creeks as a common understorey tree in rainforest margins usually at higher altitudes, also along the beach and in mangroves.

New Guinea: Central District: Yule Island, Aug 1962, *Darbyshire* 759. **Queensland.** COOK DISTRICT: Bamaga, Cape York, Sep 1963, *Jones* 21525; Between McIvor R. and Cape Flattery (15°01'S, 145°15'E), Nov 1972, *Hyland* 6501; Gap Creek about half-way between Daintree R. and Cooktown, Aug 1975, *Moriarty* 1415A; Rossville-Ayton Rd, Jul 1962, *Gittins* 580; Cyanide Creek-Cape Tribulation Road, S of Cape Tribulation (16°08', 145°27'E), Sep 1976, *Williams* 76044; McKell Road, on way to Crater from Atherton Tableland, Jul 1975, *Irvine* 1504. NORTH KENNEDY DISTRICT: Galmara, Muenga Creek, Cardwell, Aug 1976, *Thorsborne* 275; Hinchinbrook Island, Little Ramsay Bay, Aug 1975, *Sharpe* 1792. WIDE BAY DISTRICT: S.F.R. 502, 3 km N of Gympie, Sep 1976, *Henderson*; Tin Can Bay, Sep 1943, *White* 12306; Fraser Island, Oct 1919, *Petrie*.

Very variable species in leaflet shape, size and arrangement.

4. *Guioa coriacea* Radlk., Abh. Sitzungsber. Bayer. Akad. 60 (1886). Based on *Atalaya coriacea* Radlk., Sitzungsber. Bayer. Akad. 326 (1878). **Type:** Lord Howe Island, *Fullagar* (not seen).

Cupania howeana Maiden, Proc. Linn. Soc. N.S.W., 23:126, Pl. 1 (1898). **Type:** Lord Howe Island, *J. H. Maiden* (not seen).

Misapplied name: *Cupania anacardioides* auct non A. Rich.; F. Muell., *Fragm.* 9:91 (1875).

Trees to 13 m; young parts, branchlets, petioles and peduncles finely pubescent with pale rusty appressed hairs. Leaves with 1–4 pairs of opposite leaflets, petioles and rachises with an adaxial ridge; petioles 1–2 cm long, subterete, pulvinate; rachises 3–5.5 cm, broad and somewhat flattened, mostly slightly margined and dilated below each pair of leaflets, puberulent; pinnae elliptic oblong, narrowly elliptic or subobovate, obtuse or slightly retuse at tips; margins entire, recurved; bases cuneate or acute and decurrent into short petiolules, 4–6 × 1.2–2.2 cm, glabrous or midribs below subglabrous, thickly coriaceous, subrigid, lateral nerves 10–12 pairs subpatent, looping at margins, with or without a solitary hairy domatia towards the base; petiolules 2–3 mm long, pulvinate, puberulent. Panicles solitary in each axil, about 15 × 8 cm, divaricately branched and fairly densely flowered, peduncles slightly angular, primary ones globose at base. Flowers (male) about 7 mm diam.; pedicels 6 mm long, pubescent; calyx lobes 3–5 × 2–5 mm, suborbicular; petals subobovate, narrowly clawed, 5 × 3 mm, margins incurved at base into 2 broad crested scales, puberulent on scales and claw; disc complete; filaments 6 mm long, pubescent from above middle to base. Female flowers not seen. Capsules obcordate, abruptly attenuate into short stipe, 1.2–2 × 2.6–3.2 cm. **Fig. 2 B, C.**

Restricted to Lord Howe Island, New South Wales.

Lord Howe Is: May 1920, *Boorman*; Jan 1899, *King*.

5. *Guioa semiglauca* (F. Muell.) Radlk., Sitzungsber. Bayer. Akad. 9:608 (1879); Domin, *Biblioth. Bot.* 89:903 (1927); Francis, *Aust. Rain.-For. Trees*, ed. 3:249 (1970). Based on *Arytera semiglauca* F. Muell., *Trans. & Proc. Philos. Inst. Vict.* 3:25 (1859). **Type:** Moreton Bay, *Hill & Mueller* (not seen).

Cupania semiglauca (F. Muell.) F. Muell. ex Benth., *Fl. Aust.* 1:457 (1863).

Nephelium semiglaucum (F. Muell.) F. Muell., *Fragm.* 4:158 (1864) excl. var.; F. M. Bailey, *Qd Fl.* 1:302 (1899).

Trees to 18 m high, 30 cm girth; bark grey; young parts, branchlets, petioles and peduncles finely pubescent with short pale rusty-brown appressed hairs; branchlets ribbed towards the apex. Leaves with 1–2(–3) pairs of opposite or subopposite leaflets; petioles 1–3 cm long, semiterete, pulvinate; rachises 1–5.5 cm, semiterete, often with fine adaxial ridge; pinnae obovate-elliptic to elliptic-oblong, oblique or slightly falcate, rounded or obtuse and apiculate at tips, margin entire, bases, acute, decurrent, 4.5–8.5 × 1.5–3 cm, glabrous above, ± glaucous and puberulent below, semicoriaceous, pellucid punctate; lateral nerves 8–12 pairs, suboblique, fine, looping at margins, reticulate venation fine, prominent, foveolules absent; petiolules 2–4 mm, pulvinate. Panicles mostly solitary in each axil, 3–15 cm long and as wide, densely flowered and usually many branched, often branching from the base, peduncles slender, cymes 3–7-flowered, stalked; bracts to 1 mm long. Flowers pale green about 4 mm diam.; pedicels 2 mm long, subglabrous; calyx lobes 1.5–2.5 × 1.5–2.5 mm, elliptic or suborbicular; petals subobovate-elliptic with slender claw, 1.5 mm long; scales slender as long as or longer than petal, pilose, tipped by yellow crests; disc complete or incomplete; filaments 2.5 mm long, pubescent; ovaries hairy on angles. Capsules obcordate shortly attenuate at base, 0.6–0.8 × 1–1.3 cm, greyish green. **Fig. 2 D, E, F, G.**

Central Queensland to Hunter River, New South Wales. Usually at edge of rainforests, along creeks and on hillsides.

Queensland. SOUTH KENNEDY DISTRICT: Dalrymple Heights and vicinity, Jul–Nov 1947, *Clemens*. WIDE BAY DISTRICT: Stony Creek near Bundaberg, Jan 1939, *Goy & Smith* 634. BURNETT DISTRICT: Bunya Mts, Oct 1919, *White*. MORETON DISTRICT: Upper Brookfield Road, Upper Brookfield 2.5 km NW of Post Office, Nov 1972, *Sharpe & Lebler* 172; Beechmont Ridge, Beechmont, Oct 1969, *Schodde* 5589; Bonogin Road, 8 km SSW Mudgeeraba, Oct 1976, *McDonald & Whiteman* 1632. **New South Wales:** Broughton Ck between Nowra and Kiama, Jun 1959, *Webb & Tracey* 3674; Glenreagh, bank of Orara River, Oct 1930, *White* 7443; Tweed River opposite Stott's Island, Feb 1975, *Williams* 75010.

6. *Guioa montana* C. White, *Contr. Arnold Arbor.* 4:60 (1933). **Type:** Mt Bartle Frere, *S. F. Kojewski* 1286 (BRI, holotype).

Trees to 20 m high, 20 cm girth; young parts and peduncles densely pubescent with fine pale brown appressed hairs, branchlets ribbed and pubescent towards their tips. Leaves with 1–2(–3) pairs of opposite or subopposite leaflets; petioles 1–2.5 cm long, terete, trisulcate and pulvinate at base, puberulent to subglabrous; rachises 1.5–2.5 cm long, subterete, adaxially ridged, puberulent; pinnae elliptic or elliptic-oblong, tips acute or acuminate rarely obtuse, apiculate, margins entire, slightly recurved, bases acute and decurrent into petiolules, 4–10 × 1.6–3.8 cm, coriaceous and subrigid, glabrous and shiny above, pale, papillose and puberulent below, lower surfaces sometimes with scattered slender red glands; lateral nerves 10–12 pairs, fine, oblique, looping at margins; reticulate venation coarse, prominent (raised in dried specimens), foveolules absent. Panicles mostly solitary in each axil, branching from the base, 3–12 cm long, to 7 cm wide, laxly flowered, primary peduncles globose at base. Flowers 5–6 mm diam.; pedicels 4 mm long; calyx lobes broadly ovate or elliptic, 2.5–3.5 × 1.5–2.5 mm, puberulent towards the centre on outside; petals narrowly ovate-oblong or subobovate, not clawed, 3 × 1 mm; scales small, 2-lobed, linear-oblong, puberulent, crested; disc complete; filaments puberulent or glabrous, 2.5–4 mm long. Capsules 1.2–1.6 × 2.2–2.5 cm, carinate at sutures towards base. **Fig. 2 H, I, J.**

Northern Queensland on ranges near Herberton and on Bellenden Ker Range, in rainforests at altitudes over 1000 m.

COOK DISTRICT: S.F.R. 143, North Mary L.A. (16°35'S, 145°15'E), Oct 1975, *Hyland* 7021; S.F.R. 185 Emerald L.A. (17°09'S, 145°38'E), Sep 1972, *O'Farrell* 98; S.F.R. 194 (17°15'S, 145°25'E), Jul 1968, *Hyland* 1628; Mt Bellenden Ker about 1.4 km SE of centre peak, Jun 1969, *Smith* 14705A.

The few specimens are hard to distinguish from some specimens of *G. semiglaucula*, except for their more pointed leaflets and large flowers and fruits. More collections are necessary before any conclusion can be drawn.

Imperfectly known species: *Guioa chrysantha* Radlk., *Fedde Repert.* 20:28 (1924). **Type:** Richmond River, *C. Moore* (not seen).



Fig. 2. *GUIOA*. *G. acutifolia*: A. branchlet with inflorescence ($\times 1$). *G. coriacea*: B. leaf ($\times 1$). C. fruit ($\times 1$). *G. semiglaucua*: D. fruiting branchlet, some fruits dehiscent showing seeds ($\times \frac{3}{4}$). E. fruit ($\times 1$). F. petal ($\times 12$). G. inner and outer (smaller) calyx lobes ($\times 6$). *G. montana*: H. male flower with two petals removed ($\times 6$). I. petal ($\times 6$). J. dehiscent fruit ($\times 3$). *G. crenifoliola*: K. leaf ($\times \frac{1}{2}$). L. leaflet ($\times 1$). M. *G. lasineura*: flowering branchlet ($\times 1$). N. fruit ($\times 1$).

RHYSOTOECHIA

Rhysotoechia Radlk., Actes. Congr. Bot. Amsterd. (1877): 131 (1879); & in Engl., Pflanzenr. Heft 98f: 1209–1216 (1933). **Type:** *R. mertoniana* (F. Muell.) Radlk., based on *Cupania mortoniiana* F. Muell. (lectotypus novus).

Trees mostly glabrous: indumentum if present mostly of simple appressed hairs. Leaves paripinnate; leaflets 1–6–paired, subopposite or opposite, entire, coriaceous, subrigid, drying yellowish-green; petiolules pulvinate. Inflorescences axillary or subterminal, mostly solitary, thryoid, paniculate; bracteate. Flowers regular, mostly unisexual and monoecious; pedicellate; calyces 5–partite, lobes 2–seriate, imbricate, outer pair smaller, mostly thicker, broadly ovate; inner ones elliptic to obovate, concave, margins petaloid, ciliolate; petals 5, broadly obovate or suborbicular with short claw, or obrullate, basal margins (above claw) thickened or inflexed with 2 scale-like appendages, crests absent; discs annular; stamens 7 or 8, filaments hairy towards base; ovaries obovoid, 3–(or 2–) locular, ovules solitary in each cell. Capsules sessile or stalked, subglobose, obovoid or obcordate and 3–or 2–lobed, usually turgid, subdrupaceous with fleshy exocarp, loculicidally dehiscent; valves coriaceous, glabrous, mostly glandular inside, drying wrinkled and reflexed; seeds shiny, blackish, with small, fleshy, yellow, oblique (\pm ventral) basal aril.

About 14 species, Philippines, Borneo and Australia; four in eastern Australia.

1. Leaves with petiole 6–20 cm long; leaflets 1–3–paired, 5·5–12·5 \times 2·5–5·8 cm, laxly nerved, lateral nerves 5–10 pairs, looping away from margins. Panicles to 26 \times 12 cm, laxly flowered. Petals with scale-like appendages. Capsules mostly obcordate and often slightly winged or carinate at sutures at base, divaricately lobed 2

Leaves with petiole (14·5–)23–48 cm long; leaflets 2–4(–6)–paired, 7–17(–25) \times 2·5–5·5(–9·5) cm, densely nerved, lateral nerves 12–20 pairs, free or looping near margins. Panicles to 34 cm long and as wide, densely flowered. Petals scaleless. Capsules obovoid or subglobose, attenuate at base, not carinate at sutures nor divaricately lobed 3

2. Leaflets 1–or 2–paired, tips broad, obtuse or rounded; surfaces glossy or dull; petiolules 2–7 mm long. Flowers 5–7 mm diam.; pedicels to 5 mm long. Peduncles and discs hairy. Capsules sessile or subsessile 1. **R. bifoliolata**

Leaflets mostly 2–or 3–paired, tips acute or acuminate; surfaces vernicose; petiolules 8–18 mm long. Flowers 8–10 mm diam.; pedicels 6–9 mm long. Peduncles and discs glabrous. Capsules stipitate 2. **R. mertoniana**

3. Petiolules to 6 mm long; pulvinus 1–2 mm long. Branchlets and leaves usually puberulent. Surfaces shiny, \pm coarsely nerved. Capsules 3–locular 3. **R. robertsonii**

Petiolules 7–10 mm long; pulvinus 5–7 mm long. Branchlets and leaves glabrous. Surfaces vernicose, finely and densely nerved. Capsules mostly 2-locular ... 4. **R. flavescens**

1. **Rhysotoechia bifoliolata** Radlk., Sitzungsber. Bayer. Akad. 9:541, n 591 (1879); & Pflanzenr. Heft 98f: 1211 (1933); Domin, Biblioth. Bot. 89:905 (1927); Francis, Aust. Rain-For. Trees ed. 3, 252 (1970). **Type:** Rockhampton, *O'Shanesy* (not seen).

Cupania (Cupaniopsis) dunnii Maiden & Betche, Proc. Linn. Soc. N.S.W. 33:305 (1908). **Type:** New South Wales: Acacia Creek via Killarney, *W. Dunn* (BRI, iso).

Misapplied name: *Cupania robertsonii* F. Muell., Fragm. 9 (non 5): 94 (1875) p.p. quoad specimen foliis 2-foliolatis, Rockhampton, coll. *O'Shanesy*.

Trees to 20 m high, 35 cm girth; glabrous except puberulous young parts and peduncles. Leaves with 1 or 2 pairs of leaflets, petioles and rachises \pm isobilateral, petioles 1·5–4 cm long; rachises 2–3·5 cm long; pinnae opposite, elliptic or elliptic-obovate or broadly elliptic, tips broad, obtuse, rounded, or subacute, sometimes emarginate, margins slightly recurved, bases acute, 5·5–7(–8·5) \times 2·5–4 cm, thick, glossy above, dull below; lateral nerves 6–10 pairs, subpatent,

looping away from margins, reticulate venation lax; petiolules 2–7 mm long, semiterete pulvinate. Panicles axillary, laxly flowered, 4–9.5 cm long and to 4 cm wide. Flowers orange-cream, 5–7 mm diam.; pedicels about 5 mm long; calyx lobes 2–3 × 1.5 mm, glabrous, margins pale; petals obtrullate or obovate 2–3.5 × 2.5–3 mm, with inflexed, thick, very curly basal margin forming a scale-like appendage, puberulent on both surfaces from above middle to base; disc pubescent; filaments 3–4 mm long, pubescent, exerted, anthers glabrous. Capsules sessile or subsessile, subglobose to obcordate, subtruncate or lobed at apiculate apex (residual style), often narrowly winged or carinate at base, orange-yellow, 1.5–2.6 × 1–3.2 cm, 3-lobed, lobes divaricate, subglobose, turgid or compressed; seeds ellipsoid. **Fig. 3A, B, C, D, E, F.**

Central Queensland to Upper Hunter River, New South Wales, usually on ranges at edge of rainforests.

Queensland. PORT CURTIS DISTRICT: Bulburin, Many Peaks Range, Jul 1959, *Webb & Tracey* 3729. WIDE BAY DISTRICT: Near Maryborough, Sep 1948, *Clemens*. MORETON DISTRICT: Witta area, 3 km N of Maleny, May 1959, *Smith* 10549; Mt Roberts, McPherson Range, Aug 1945, *Blake* 15925; Sarabah Range about 24 km S of Canungra, O'Reilly's Road, Lamington Plateau, Aug 1963, *Schodde* 3365; O'Reillys Guest House, Dec 1978, *Harman*.

2. *Rhysotoechia mortoniana* (F. Muell.) Radlk., Sapind. Holl.-Ind. 62 (1879); & Pflanzenr. Heft 98f: 1212 (1933); Domin, Biblioth. Bot. 89:905 (1927). Based on *Cupania mortoniana* F. Muell., *Fragm.* 5:177 (1866). **Type:** Rockingham Bay, *Dallachy* (not seen).

Slender trees to 7 m; glabrous. Leaves with petiole (7–)12.5–20 cm long with (1–)2–3 leaflets each side of rachis; petioles 3–7.5 cm long, semiterete, shortly pulvinate; rachises 2.5–14 cm long, subterete; pinnae broadly elliptic or ovate–elliptic, apices acute, abruptly and shortly acuminate or obtuse, abruptly narrowing at base, acute, oblique, 6–12.5 × 2.5–5.8 cm, vernicose above, midribs broad, striate below; lateral nerves 5–9 pairs, ± patent and looping away from margins, prominent especially below, reticulate venation lax; petiolules 0.8–1.8 cm long, pulvini 2–5 mm. Panicles in upper axils, to 26 × 12 cm, laxly branched and flowered, peduncles slender. Flowers 8–10 mm diam.; pedicels 6–9 mm; calyx lobes puberulent, outer to 3 × 2 mm, inner 6 × 5 mm; petals white, broadly obovate, 4–5 × 3.5 mm, hairy at base on both surfaces and with scattered glands, lower margins inflexed into 2 hairy scale-like appendages; disc glabrous; filaments 4 mm long, puberulent, anthers 1.5 mm long. Capsules stipitate, broadly obcordate or obovoid, often keeled at sutures towards base, yellow with red flush, 1.2–1.4 × 2–3.2 cm including stipe, 2– or 3-lobed, lobes divaricate, subglobose, valves thin coriaceous; stipe 4–6 mm long. **Fig. 3 G, H.**

Northern Queensland, around Atherton Tableland. At edge of rainforests at high altitudes, usually on steep slopes.

COOK DISTRICT: Between Kuranda and Barron Falls, Jan 1949, *Smith* 4273; Kuranda Road, Jul 1977, *Godfrey*; Saddle Mt near Kuranda, Jul 1968, *Brass* 33875 (QRS); Danbulla via Kairi, Sep 1948, *Byrne*; Deeral near Babinda, Jul 1943, *Blake* 14971; S.F.R., Range between Atherton and Herberton, Dec 1952, *White* 391. **NORTH KENNEDY DISTRICT:** Koolmoon Creek, Nov 1958, *Smith* 10467; Tully Falls, Nov 1949, *Fielding* (QRS).

3. *Rhysotoechia robertsonii* (F. Muell.) Radlk., Sitzungsber. Bayer. Akad. 9:542 (1879); & Pflanzenr. Heft 98f: 1214 (1933); Domin, Biblioth. Bot. 89:905 (1927). Based on *Cupania robertsonii* F. Muell., *Fragm.* 5:146 (1866). **Type:** Rockingham Bay, *Dallachy* (not seen).

Spreading trees to 16 m tall, 75 cm girth; young parts rusty villous pubescent; branchlets pale, puberulent, lenticels minute. Leaves with petiole (14.5–) 23–30 cm long, with 3(–5) leaflets each side of rachis; petioles and rachises semiterete; petioles 2.5–4 cm long, pulvinate; rachises (3–) 9–12.5 cm, dilated and slightly winged below each pair of leaflets; pinnae elliptic-oblong or subobovate-elliptic, tips acuminate (often abruptly and bluntly acuminate) or acute, margins slightly recurved, bases oblique, acute or cuneate, 7–17(–21) × 2.5–5.5(–8.5) cm, upper surfaces shiny, glabrous, lower ones puberulent; lateral nerves suboblique, 12–16 pairs, reticulate venation ± coarse, prominent; petiolules 2–6 mm long, pulvini 1–2 mm long. Panicles axillary, 14–25 cm long and as wide, densely flowered, peduncles glabrous, lenticellate. Flowers cream, 5–7 mm diam.; pedicels 2–4 mm, glabrous; calyx lobes 2–3 × 1–2 mm; petals obtrullate, 2 × 1.5 mm, with very slightly thickened basal margins, puberulent inside, and towards base outside, ciliolate on margins; filaments 1.2 mm long, anthers as long; ovaries subglabrous. Capsules shortly stipitate, obovoid or subglobose abruptly narrowed at base, apiculate (residual style), orange-yellow with red flush, 1.6–2.8 × 2.2–3.2 cm; 3-locular; valves coriaceous, reticulate, glandular within; seeds often embedded in watery gluey substance; stipe to 4 mm long. **Fig. 3 L, M, N.**

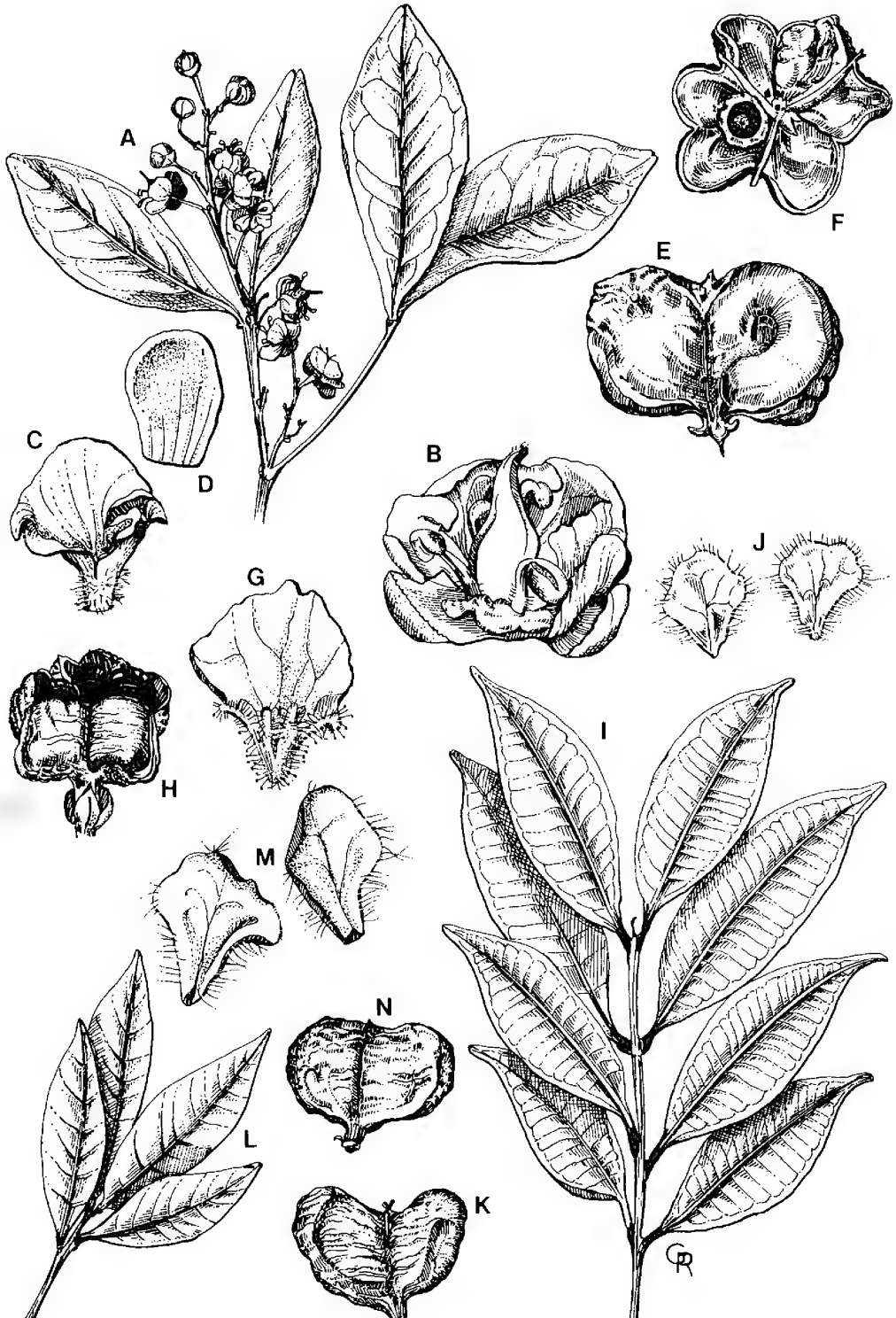


Fig. 3. *RHYSOTOECHIA*. *R. bifoliolata*: A. flowering branchlet ($\times 1$). B. female flower with one petal removed ($\times 6$). C. petal ($\times 12$). D. calyx lobe ($\times 6$). E. fruit ($\times 1$). F. dehiscent fruit showing seed and aril. *R. mortoniana*: G. petal ($\times 6$). H. slightly dehiscent fruit ($\times 1$). *R. flavescens*: I. leaf ($\times 1/4$). J. petals ($\times 12$). K. fruit ($\times 1$). *R. robertsonii*: L. leaf ($\times 1/4$). M. petals ($\times 12$). N. fruit ($\times 1$).

Northern Queensland, from Mt Molloy to near Cardwell, chiefly coastal but quite common on Atherton Tableland; in fringing rainforests along creeks.

COOK DISTRICT: Near Bushy Creek on the Mt Molloy-Julattan Road, just SW of Julattan, Dec 1976, *Moriarty* 2175; Little Mulgrave River (17°95'S, 145°40'E), Nov 1976, *Hyland* 9209; Russell River (17°20'S, 146°00'E), Nov 1975, *Dockrill* 1082; Gadgarra, S.F.R. 310, Dec 1952, *White* 53/301 (461); Harvey Creek, Nov 1947, *Flecker*; Wongabel-Ravenshoe Road, S.F.R. 191, Dec 1953, *White*; NORTH KENNEDY DISTRICT: Meunga Creek (near Cardwell), Apr 1865, *Dallachy*; Ravenshoe, S.F.R. 251 (17°40'S, 145°30'E), Nov 1961, *Volck*.

R. contermina Domin from Harvey Creek probably belongs here (ex descr.).

4. *Rhysotoechia flavescens* Radlk., Sitzungsber. bayer. Akad. 9:541 (1879); & Pflanzenr. Heft 98f: 1215 (1933); Domin, Biblioth. Bot. 89:905 (1927). **Type:** Rockingham Bay, *Dallachy* (not seen).

Misapplied name: *Cupania robertsonii* F. Muell., Fragm. 9:94 (1875) p.p. (quoad specimen petalis secus totam faciem interiorem pubescentibus insigne).

Trees to 14 m tall, 15 cm girth, often multistemmed; glabrous; branchlets slightly raised below insertion of leaves. Leaves with petiole 26–48 cm long with 1–4(–6) leaflets each side of rachis; petioles 3.5–8 cm long, terete, broad and pulvinate; rachises 17–22.5 cm long, semiterete; pinnae oblong ovate-elliptic or elliptic-oblong, somewhat subfalcate towards tips, mostly abruptly and shortly acute-acuminate or subcaudate at apices, margins slightly recurved, bases often abruptly acute, very oblique, 13–16(–25) × 4.5–5.5(–9.5) cm, glabrous, vernicose above; midrib broad, raised below, striated; nerves (lateral and tertiary) and reticulate venation very fine, prominent, lateral nerves 12–20 pairs, slender, patent, looping near margins; reticulate venation very dense; petiolules 0.7–1 cm long, pulvini 5–7 mm long. Panicles axillary or subterminal, large, 20–34 × 8–34 cm, copiously flowered, peduncles glabrous; cymules 3–9-flowered; bracts ovate acuminate, 1 × 0.5 mm. Flowers cream, 6–7 mm diam.; pedicels 2–5 mm; calyces glabrous, outer lobes 1.5–3 × 1.5–2.5 mm, inner ones 3.5–4 × 3–4 mm; petals obtrullate, long clawed, 2.5 × 2 mm, membranous, densely hairy inside and towards base outside, lower margins slightly incurved or thickened; disc fleshy, glabrous; filaments 4–5 mm (staminodes 2 mm) long, densely villous, anthers ovoid-oblong, apiculate, 1.25 × 0.5 mm, puberulent; ovaries shortly stipitate, glabrous, styles 1–2 mm long. Capsules broadly obovoid, attenuate at base into a short stipe, 1.8–2 × 2–2.5 cm including stipe, retuse or broadly lobed at apex, 2-locular, valves thickly coriaceous, reticulate, wrinkled when dry; stipe 3–5 mm long. **Fig. 3 I, J, K.**

Northern Queensland, around Atherton Tableland. In rainforests usually in mountainous country.

COOK DISTRICT: S.F. 143, Little Mossman Logging Area (16°32'S, 145°23'E), Oct 1978, *Moriarty* 2472 (QRS); S.F.R. 1073, Rooty L.A. (16°40'S, 145°30'E), Mar 1976, *Hyland* 8649 & 8650; S.F.R. 185 (17°10'S, 145°40'E), Feb 1969, *Hyland* 2178 (QRS). NORTH KENNEDY DISTRICT: S.F.R. 200, Tully area, Dec 1952, *White* 53/295.

Imperfectly known species: *Rhysotoechia contermina* Domin, Biblioth. Bot. 89:905 (1927). **Type:** Harveys Creek, *Domin* (not seen).

Probably conspecific with *R. robertsonii* which occurs in the same area.

CUPANIOPSIS

Cupaniopsis Radlk., Sitzungsber. Bayer. Akad. 9:483, 498 (1879), & in Engler, Pflanzenr. 98f:1177–1208 (1933); Domin, Biblioth. Bot. 89:903 (1927). **Type:** *C. anacardioides* (A. Rich.) Radlk., based on *Cupania anacardioides* A. Richard (leptotypus novus).

Trees; branchlets terete, ribbed and hairy towards apex; indumentum of simple hairs; lenticels small, pale. Leaves petiolate, paripinnate; leaflets 1–12-paired, margins entire, serrate or crenate; petiolulate. Inflorescences axillary, polygamo-monoecious, racemiform or paniculiform; cymules stalked or sessile, 3–5-flowered; bracteate. Flowers regular; pedicellate or sessile; calyx 5-lobed, lobes 2-seriate, imbricate, outer pair smaller, suborbicular or broadly ovate; inner ones oblong or elliptic; concave, usually sericeous outside except glabrous, ciliolate eroded margins;

petals smaller than calyx, broadly ovate or obovate, usually sessile; scales 2-cleft, oblong, hairy, crestless; disc annular, crenate; stamens 6–10, filaments filiform, pilose in lower half; anthers ovate-oblong, glabrous; ovary subglobose, 3(or 4)-locular, ovules solitary in each cell, style short, usually persistent. Capsules sessile or stipitate; obovoid or subglobose, often cuspidate (residual style), 3-sulcate or 3-lobed; 3-locular; 3-seeded; 3-valved, valves \pm fleshy, glabrous or hairy outside, villous inside, usually drying wrinkled outside; seeds ellipsoid, shiny; aril thin, cupular, distally fimbriate or eroded, nearly enclosing seed.

About 66 species, New Guinea, Australia, New Caledonia and Fiji; ten species (two new) in Australia.

1. Leaflets cuneate; apex broad, truncate, lobed or toothed. Uppermost pair the largest 2
 - Leaflets obovate, elliptic, oblong or ovate-oblong; apex obtuse, retuse, acuminate, cuspidate, acute. Uppermost pair not usually the largest 3
2. Leaflets 3–5(–7)–paired; lowermost pair stipule-like; margins serrate; lower surfaces hairy. Inflorescences spiciform 1. **C. shirleyana**
 - Leaflets 1– or 2–paired; lowermost pair not as above: margins entire (except juveniles); surfaces glabrous. Inflorescences racemiform 2. **C. wadsworthii**
3. Domatia or foveola present 4
 - Domatia or foveola absent 5
4. Margins crenate or subentire; apex usually acuminate or acute; disc hairy. Leaflets narrowly ovate or elliptic-oblong. Foveola usually along whole midrib 3. **C. foveolata**
 - Margins entire (except juvenile ones); apex broad obtuse or retuse; disc glabrous. Leaflets obovate or elliptic. Domatia few (1–5) per leaflet 4. **C. fleckeri**
5. Margins entire: apex broad, obtuse or retuse. Flowers and fruits stalked. Leaflets glabrous 6
 - Margins serrate, serrulate, sinuate or subentire; apex acuminate or cuspidate, obtuse or acute. Flowers and fruits sessile or subsessile. Leaflets usually hairy on lower surfaces 7
6. Lateral nerves close to each other, 2–5 mm apart; reticulate venation inconspicuous above. Panicles less than 7.5 cm long. Leaflets 2.5–7 × 0.7–2.6 cm, thickly coriaceous. 5. **C. parvifolia**
 - Lateral nerves widely spaced, 6–20 mm apart; reticulate venation prominent both surfaces. Panicles more than 8 cm long. Leaflets (4.5–)6–15.5(–19) × (1.7–)3–7.5 cm, thinly coriaceous 6. **C. anacardioides**
7. Lower surface of leaflets puberulous or subglabrous especially on midribs and nerves 8
 - Lower surface of leaflets usually densely hairy especially on midribs and nerves 10
8. Petiolules (8–)15–30 mm long. Leaflets (6–)10–12 paired; glabrous or subglabrous. Leaf including petiole (34–)46–72 cm long. Flowers subsessile, pink 7. **C. newmanii**
 - Petiolules 1–12 mm long. Leaflets 3–7(–10)–paired; usually puberulous especially on nerves below. Leaf including petiole 9.5–38(–45)cm long. Flowers sessile, pink or white 9
9. Inflorescences 1–6.5 cm long, racemiform rarely 1 or 2 branched. Fruits velvety hairy. Flowers white. Petiolules 1–5 mm long. Pinnae long acuminate or cuspidate at apex; not regularly serrate or serrulate and nerved; teeth usually sharp 8. **C. serrata**

Inflorescences 5.5–35(–55) cm long, usually many branched. Fruits ± villose hairy. Flowers pink. Petiolules 1–12 mm long. Pinnae broad at apex, truncate cuspidate or acute, if acuminate then not as above; usually regularly serrate or serrulate and nerved; teeth small incurved, or coarse 9. **C. flagelliformis**

10. Margins subentire or sinuate with few minute teeth; apex broad, rounded, obtuse or subtruncate; lateral nerves fine, irregular. Male panicles 4–9 cm long, branches few, 2–5.5 cm long. Capsule depressed ellipsoid, 2–2.5 × 3–4 cm. Flowers white 10. **C. tomentella**

Margins serrate, serrulate or sinuate; usually regularly serrulate and nerved; apex obtuse, truncate, denticulate or cuspidate. Male panicles 5.5–55 cm long; branches many, 3.5–60 cm long. Capsule broadly obovoid, 1.4–2.2 × 1.6–2.6 cm. Flowers pink 9. **C. flagelliformis**

1. **Cupaniopsis shirleyana** (Bailey) Radlk., Fedde Repert. 20:22 (1924), & in Engler, Pflanzenr. 98f: 1188–89 (1933); Domin, Biblioth. Bot. 89:904 (1927); Francis, Aust. Rain-For. trees ed 3.249 (1970). Based on *Cupania shirleyana* Bailey, Synop. Qd Fl. 2nd suppl. 15 (1888) & Qd Fl. 1:290 (1899). Type: Sankey's scrub off Logan Road, Brisbane. *F. M. Bailey* (BRI, holotype).

Small trees to 10 m; young parts, branchlets, petioles, rachises, peduncles pubescent with long pale brown spreading hairs intermingled with shorter ones; lenticels pale. Leaves (with petiole) 6–14 cm long with 3–5(–7) pairs of leaflets; petioles 2–5(–12) mm long, semiterete, pulvinate; rachises 4–8(–10.5) cm long, bisulcate above; pinnae opposite or subopposite; lower most pair smallest, stipule-like, obliquely broadly cuneate; others cuneate or oblong cuneate, apex truncate, mucronate or obtuse, usually coarsely toothed; margins irregularly sharply serrate or serrulate especially above middle, base cuneate, 0.8–5.5(–8.5) × 0.8–3.2(–4) cm, glossy, glabrous or puberulous especially on midribs above, pubescent or puberulent below, semicoriaceous; lateral nerves 3–8 pairs, patent, terminating in serrations, raised below; petiolules to 1 mm long, ± pulvinate. Inflorescences ± spiciform 5–18 cm long. Flowers to 7 mm diam.; sessile or pedicels to 1 mm long; calyx lobes obovate or suborbicular, 4–5 × 1.5 mm, rusty pubescent outside; petals obovate, 2 × 2 mm, hairy outside, scales longer than petal; disc glabrous; filaments 2 mm long, anthers 1 mm long; ovaries pubescent. Capsules subglobose or broadly ovoid, orange, 1.5 × 1.5–1.7 cm, trisulcate, finely velvety hairy outside; valves thin, puberulous inside: seed nearly enclosed in orange-red aril. **Fig. 4P.**

Central and southeastern Queensland; along riverbanks, in dry rainforests.

PORT CURTIS DISTRICT: E of Miriam Vale (24°10'S, 151°50'E), Eurumbula Holding, Dec 1970, *Webb & Tracey* 10358; Baffle Creek district, Apr 1920, *White*. WIDE BAY DISTRICT: Bingera, Oct 1948, *Smith* 4119; Yandaran Ck, Bundaberg district *Michael*; Cedars Bridge Crossing on Burnett River about 5 km S of South Kolan, Sep 1972, *Bates* 335. MORETON DISTRICT: Sankey's Scrub, in 1887, *Simmonds*.

2. **Cupaniopsis wadsworthii** (F. Muell.) Radlk., Sitzungsber. Bayer. Akad. 9:483, 530 n364 etc (1879), & in Engler, Pflanzenr. 98f:1188–89 (1933); Domin, Biblioth. Bot. 89:904 (1927); Francis, Aust. Rain-For. trees ed 3.249 (1970). Based on *Harpullia wadsworthii* F. Muell., Fragm. 4:1, t.24 (1863), & 9:89 (1875). Types: Rockhampton, *Thozet & Dallachy* (not seen).

Cupania wadsworthii (F. Muell.) F. Muell., Cens. Aust. Plts. 24 (1882); F. M. Bailey, Qd Fl. 1:290 (1899). Based on *Harpullia wadsworthii* F. Muell.

Slender shrubs to 3 m; branchlets, petioles and rachises pubescent or puberulent with pale villose appressed hairs; lenticels minute, elliptic, scattered on branchlets and often on petioles. Leaf (with petiole) 4.5–6.5 cm long with 1 or 2 pairs of leaflets (3 pairs in juveniles); petioles 0.2–2.5 cm, semiterete broadly pulvinate at base; rachises 1–2 cm long, bisulcate above; pinnae opposite, broadly cuneate, apex truncate, apiculate or broadly 2- or 3-lobed; margins entire (broadly and bluntly serrate towards apex in juveniles); bases cuneate, oblique, 1.3–3.5(–8.5) × 1.3–3.5(–5.5) cm, shiny or vernicose, glabrous, or midribs below subglabrous, thinly coriaceous, pellucid punctate; lateral nerves 4–7 pairs, ± divergent, often with domatia-like pockets in their axils, nerves and reticulation fine; petiolules 1–2 mm long, thickly pulvinate, puberulent or glabrous. Inflorescences racemiform, long and graceful, 5–12.5 cm long, laxly flowered; peduncles rarely branched, puberulent, cymes 3-flowered. Flowers cream, 6–7 mm diam.; pedicels 1.5–4 mm long; calyx lobes suborbicular or elliptic, 4 × 2–3.5 mm, puberulous outside;

petals sessile, broadly ovate, 2–3 mm long and as wide, scales longer, densely ciliolate; disc glabrous; filaments 3 mm long, pilose; anthers 2 mm long. Capsules obovoid, 1.4 × 2 cm, 3-sulcate; valves thin, shortly pubescent or puberulent outside, puberulous inside. **Fig. 4O.**

Queensland: Chiefly coastal from near Shute Harbour to Mt Perry, usually on hill slopes.

NORTH KENNEDY DISTRICT: Conway S.F. between Airlie and Shute Harbour, Jun 1965, *Webb & Tracey* 7568. SOUTH KENNEDY DISTRICT: Cape Hillsborough, R. 60 Ossa (20°55'S, 149°03'E), May 1975, *Hyland* 8230. PORT CURTIS DISTRICT: 2 km N of Yeppoon, on road to Byfield, Jun 1978, *Sharpe* 2372; near Rockhampton, Feb 1922, *Higgins*. BURNETT DISTRICT: S.F.54, Burnett Range, NW of Mt Perry, Nov 1978, *Stanton*; Bulburin, Aug 1957, *Webb & Tracey* 3306.

- 3. *Cupaniopsis foveolata*** (F. Muell.) Radlk., Sitzungsber. Bayer. Akad. 9:530 n 348 (1879), & in Engler, Pflanzenr. 98f:1186 (1933); Domin, Biblioth. Bot. 89:904 (1927); Francis, Aust. Rain-For. trees ed. 3.252 (1970). Based on *Cupania foveolata* F. Muell., Fragm. 9:95 (1875); F. M. Bailey, Qd Fl. 1:292 (1899). **Types:** Nulla-Nulla, McLeay's River, Bellinger's River, Carron; Rockingham Bay, *Dallachy*; Moeresby Range, *W. Hill* (syntypes not seen).

C. baileyana Radlk., Fedde Repert. 20:32 (1924), & in Engler, Pflanzenr. 98f:1185 (1933). **Type:** Mt Mistake, *F. M. Bailey* (BRI, holotype).

Trees to 25 m high, 30 cm girth; young parts, branchlets, petioles, rachises, peduncles puberulous with minute appressed hairs, or glabrous; branchlets often scurfy, densely lenticellate. Leaf (with petiole) 15–28 cm long with 4–8(–10) leaflets on each side of rachis; petioles 3.5–5.5 cm long, subterete, often lenticellate; rachis terete, bisulcate above 6.5–14(–16.5) cm long; pinnae alternate, narrowly oblong-elliptic or oblong-ovate, bluntly acuminate or obtuse at apex; margins remotely crenate-serrulate or subentire; base obtuse, or acute slightly decurrent, often oblique, 4.5–9(–14) × 1.5–2.2(–2.5) cm, glabrous or subglabrous, glossy above, thinly coriaceous; lateral nerves 10–20 pairs, slender, subpatent, looping near margins, usually foveolate along the whole midrib; reticulate venation fine, prominent; petiolules (2–)4–10 mm long, channelled above, puberulent. Panicles erect, divaricately branched, 6.5–10 cm long and as wide. Flowers cream, 6 mm diam.; pedicels 2–4 mm long; calyx lobes suborbicular or obovate, 2.5–4 × 2 mm, puberulous or glabrous; petals broadly ovate, 2 × 1.5 mm, scales half as long, hairy; disc tomentose; filaments to 2 mm long, anthers 2.25 mm long; ovary tomentose. Capsule shortly stipitate, subglobose or subobovoid, 3-sulcate, apiculate, 1–1.3 × 1–1.3 cm; valves thin, puberulous or glabrous outside; densely villous inside; seeds with cupular orange aril. **Fig. 4E.**

Cooktown, north Queensland to Bulga Plateau, NW of Taree, New South Wales, usually in rainforests at higher altitudes.

Queensland. COOK DISTRICT: Big Tableland, about 27 km S by E of Cooktown, Sep 1960, *Smith* 11172; Kuranda, Jan 1962, *Webb & Tracey* 5721; Atherton Tableland, Danbulla area, Nov 1949, *Byrne*. NORTH KENNEDY DISTRICT: Mt Fox, Sep-Dec 1949, *Clemens*. SOUTH KENNEDY DISTRICT: Cowley S.F., W of Cathu, between Mackay and Proserpine, Jun 1965, *Webb & Tracey* 7675. MORETON DISTRICT: Robert's Plateau, McPherson Ra., Nov 1921, *Francis*; track to "Best of All" Lookout, Springbrook, Mar 1979, *McDonald & Whiteman* 2819. DARLING DOWNS DISTRICT: S.F.R. 400, about 35 km S of E of Warwick, Apr 1962, *Smith*.

Common name: White Tamarind.

- 4. *Cupaniopsis fleckeri*** S. T. Reynolds, species nova *C. anacardioides* et *C. parvifoliae* affinis ab utroque differt foliis magis chartaceis paucinervis, domatiis subtus praeditis, paniculis laxis pedunculis gracilis. **Typus.** Cook District: Coen, Mt White, Jul 1949, *H. Flecker* (BRI, holotypus).

Small trees to 9 m; branchlets, petioles, peduncles finely puberulous with pale short hairs soon glabrous; branchlets usually with scattered red resin glands and minute lenticels. Leaf (with petiole) 8–15 cm long with 4 or 5 leaflets on each side of rachis; petioles 1.5–4 cm long, terete, pulvinate; rachis 2–6(–9.5) cm long, subterete; pinnae alternate or subopposite, obovate or subelliptic, usually broader towards obtuse or retuse apex, margins entire (slightly crenate towards apex in juvenile leaves), base acute and decurrent, 2–6 × 1.3–2.8 cm, glabrous, thinly coriaceous; nerves and reticulation fine, prominent both surfaces, lateral nerves 4–10 pairs (4–10 mm apart), angle with midrib about 45°, arched and looping near margins, usually with domatia in some of their axils; domatia usually prominent 1–5 per leaflet; petiolules tumid, 1–2 mm long. Panicles 6.5–17 × 4–13 cm, laxly branched and flowered; peduncles slender, flexuose. Flower 5–8 mm

diam.; pedicels 3–6 mm long; calyx lobes suborbicular, 3.5–4 × 2.5–4.5 mm, glabrous or subglabrous; petals white, elliptic or broadly ovate, 3 × 2 mm, puberulent at base outside; scales shorter, pubescent; filaments 2 mm long; anthers as long. Fruits not seen. **Fig. 4Q.**

Cape York Peninsula, Queensland; in dry rainforest usually on sandstone.

COOK DISTRICT: Princess Charlotte Bay, northern face of Flinders Island, Aug 1979 & Mar 1981, *Smyth*; Altanmoni (14° 35'S, 144° 35'E), Jul 1972, *Hyland* 6349.

The new species has affinities with *C. anacardioides* and *C. parvifolia* but differs from both in its thinner leaflets, fewer lateral nerves and presence of domatia on lower surface, and lax panicles with slender graceful peduncles.

5. *Cupaniopsis parvifolia* (Bailey) L. Johnson, Contr. N.S.W. Nat. Herb. 3(3):98 (1962); Francis, Aust. Rain-For. trees ed. 3.249 (1970). Based on *Cupania anacardioides* var. *parvifolia* Bailey, Qd Fl. 1:290 (1899). **Types:** Main Range and several other localities, southern Queensland, *F. M. Bailey* (not seen); Mt Perry, *J. Keys* (BRI, syn).

Cupaniopsis anacardioides var. *parvifolia* (Bailey) Domin, Biblioth. Bot. 89:904 (1927).

Cupaniopsis anacardioides forma *parvifolia* (Bailey) Radlk., in Engler, Pflanzenr. 98f:1187 (1933).

Trees to 20 m high, 40 cm girth; branchlets, petioles, rachises, pubescent or puberulent with short pale brown appressed hairs; branchlets scurfy, usually resin dotted, densely lenticellate, lenticels small. Leaves (with petiole) 5.2–7.5(–15) cm long with 3 or 4(–5) leaflets each side of rachis; petioles 1–2.5 cm long, subterete, pulvinate; rachis 2.2–4.5(–6.5) cm long, semiterete, adaxially ridged; pinnae alternate or opposite, usually narrowly obovate or subelliptic, apex obtuse or retuse, margins entire, base subacute or obtuse, 2.5–7 × 0.7–2.6(–3.2) cm, glabrous, coriaceous, shiny, dark green above, glandular punctate; lateral nerves 10–14 pairs (2–5(–7) mm apart) slender, patent, reticulate venation very fine, usually indistinct above; petiolules 2–5 mm long, pulvinate. Panicles 2.5–7.5(–11) × 2.5–9 cm, peduncles tomentose. Flowers 5–6 mm diam., pedicels 3–5 mm; calyx lobes broadly ovate or suborbicular, 2–3.5 × 2–3.5 mm, puberulous or glabrous; petals broadly ovate, 1.5–2 × 2 mm, scales as long as petals; filaments 2.5 mm long, anthers 1 mm long. Capsules stipitate, subglobose, apiculate, 0.8–1.2 cm long and diam., peach with pink flush, 6–sulcate; seed enclosed in orange-yellow aril.

Southeastern Queensland to Gloucester, New South Wales, usually in dry rainforests.

Queensland. WIDE BAY DISTRICT: SE of Bundaberg, Dec 1937, *Smith* 398; Imbil, *Franke*. BURNETT DISTRICT: Eden Vale Hill near Kingaroy, Oct 1947, *Michael* 3046; Kragra, 100 km NE of Chinchilla, Aug 1979, *Lithgow*; near Menerambi, Dec 1947, *Michael* 3112. MORETON DISTRICT: Brisbane, Rafting Grounds reserve, 2 km SW of Kenmore, Oct 1979, *Jessup & Reynolds* 245; Barney View SW of Beaudesert, Jan 1953, *Constable*; Sarabah Ra., 16 km S of Canungra, Oct 1969, *Schodde* 5585; Yarraman, Oct 1924, *Cameron*. DARLING DOWNS DISTRICT: Gowrie Junction, Sep 1975, *Gilbert*. **New South Wales:** Unumagar, Jul 1948, *Jones*; Pikapene S.F. about 19 km directly S of Tabulan, Nov 1966, *Hayes, Turner & McGillivray* 2654.

6. *Cupaniopsis anacardioides* (A. Richard) Radlk., Sitzungsber. Bayer. Akad. 9:530 n 342 (1879), & in Engler, Pflanzenr. 98f:1186 (1933); Domin, Biblioth. Bot. 89:904 (1927); R. H. Anders., Trees of N.S.W. 3.254 (1957); Francis, Aust. Rain-For. trees, ed 3.249 (1970). Based on *Cupania anacardioides* A. Richard, Sert. Astrolab. 33, t. 13 (1834); Benth., Fl. Aust. 1:458 (1863); F. M. Bailey, Qd Fl. 1:290 (1899). **Type:** Moreton Bay, *Fraser* (not seen).

Trees to 15 m high, 25 cm girth; young parts pubescent or puberulent; branchlets, petioles, rachises pubescent with short pale brown appressed hairs or glabrous, lenticellate; branchlets often scurfy. Leaves (with petiole) 13–29(–40) cm long with 2–4(–6) leaflets on each side or rachis; petiole 3–7.5(–9) cm, terete, shortly pulvinate; rachis 2.5–13.5(–20) cm long, semiterete; pinnae subopposite or alternate, pale green, mostly obovate with broad retuse apex, or elliptic; apex obtuse, retuse or truncate; margins entire, base obtuse or acute, slightly decurrent, or truncate, rarely oblique, (4.5–)6–15.5(–19) × (1.7–)3–7.5 cm, glabrous or puberulous below, shiny, darker above, ± coriaceous, sometimes subrigid; nerves and reticulation prominent both surfaces, lateral nerves (6–)10–20 pairs (6–20 mm apart), patent, arched at tips and looping near margins; reticulate venation lax, fine; petiolules 2–7(–12) mm long, subterete, channelled above, pulvinate, pubescent or glabrous. Panicles 8–35 cm long to 38 cm wide, peduncles pubescent, divaricately branched; cymules 3–7-flowered, stalked, scattered along the branch. Flowers greenish yellow, 6–8 mm diam.; pedicels 3–7 mm long, puberulent; calyx lobes broadly ovate or

broadly elliptic, 2.5–4 × 1.5–2.5 mm, puberulent to glabrous; petals broadly ovate, 1.5–3 × 1.5–3 mm, scales half as long as petals; filaments 2.5–3.5 mm long, anthers 2 mm long; ovary tomentose. Capsules stipitate, subglobose, apiculatae, 3–sulcate, slightly carinate at sutures, 1.5–2.8 × 1.5–2.2 cm, golden yellow with red tinge, puberulent and usually scurfy on outside; valves thick, coriaceous, densely white villous hairy inside: seed enveloped in yellow or orange-red aril. **Fig. 4F, G.**

Widespread along the coast of Western Australia, Northern Territory, Queensland to Port Hacking New South Wales, also in New Guinea; on rocky beaches, hilly scrubs, riverine forests.

New Guinea: Western District: Between Bula and Wunj, near mouth of Morehead River, Aug 1967, *Pullen* 7020. **Western Australia:** Pt Warrender, Jul 1973, *Webb & Tracey* 13132. **Northern Territory:** South Alligator River, Jul 1975, *Parker* 668; Groote Eylandt, Mud Cod Bay, Aug 1972, *Dunlop* 2955. **Queensland:** COOK DISTRICT: Saibai, Torres Strait, Jul 1975, *Stocker* 1405; Bonanza Ck., Peach River, Aug 1913, *Brass* 19836; Little Mitchell River, about 8 km S of Mt Molloy, Aug 1948, *Smith* 3901. BURKE DISTRICT: 8 km E of Karumba on Karumba-Dunbar Road, May 1970, *Webb & Tracey* 10708. NORTH KENNEDY DISTRICT: Home Hill district, Wangaratta Creek, Dec 1968, *Wyatt* 3; Kelsey Ck near Proserpine, *Heatwole*. SOUTH KENNEDY DISTRICT: Penrith Is., Great Barrier Reef, Aug 1969, *Heatwole*. PORT CURTIS DISTRICT: Coconut Pt, 4 km S of Emu Park, Jul 1977, *Batianoff & McDonald* 139. WIDE BAY DISTRICT: Fraser Is, Dec 1919, *Epps*: Bauple, Jun 1945, *Clemens*. BURNETT DISTRICT: Castle Mt, Cania Gorge, Nov 1976, *Ross*. MORETON DISTRICT: Brisbane River, Sep 1828, *Cunningham*; Moreton Is., Oct 1973, *Durrington* 1258. **New South Wales:** Iluka, mouth of Clarence River, Dec 1961, *Pedley* 949.

Very variable species in size of leaves, leaflets, inflorescences and flowers. Collections from the islands, frontal dunes and rocky headlands have smaller rigid leaflets approaching *C. parvifolia* in size but easily distinguished from it by its prominent lax nerves and reticulations, and shorter petiolules.

Common name: Tuckeroo.

Uses: Much grown as a park and street tree.

7. *Cupaniopsis newmanii* S. T. Reynolds, species nova affinis *C. flagelliformis* (Bailey) Radlk. sed differt essentialiter habitu et fructibus velutinis obovoid-obcordatis, foliis majoribus et petiolulis longioribus. **Typus:** Moreton District: Lower Beechmont road, near Numinbah Valley road intersection, Dec 1978, *L. W. Jessup & S. T. Reynolds* 158 (BRI, holo).

Small trees 2–6 m, usually single stemmed; young parts finely hairy; branchlets stout, fluted, velvety hairy towards their tips with pale brown ± curved hairs; lenticels pale, small on branchlets petioles and rachises. Leaves (with petiole) (34–)46–72 cm long with (6–)10–12 leaflets each side of rachis; petioles (5.5–)8–16 cm long, semiterete, trisulcate at base, puberulent towards base or glabrous; rachis 21–37 cm long, terete, puberulent or glabrous; pinnae reddish pink when young, opposite or alternate, narrowly ovate-oblong, elliptic-oblong or ovate-elliptic, apex acuminate, shortly cuspidate, subacuate or obtuse; margins remotely and usually irregularly serrulate or sinuate, with small occasionally incurved teeth; base obtuse, subacute, truncate, oblique, 6.5–20 × 2.5–7.5 cm, glabrous, or lower surfaces subglabrous or puberulent especially on midrib and nerves; coriaceous, subrigid and coarse; lateral nerves 8–16 pairs, oblique and divergent (angle with midrib 40°–50°), raised below; reticulation prominent; petiolules (0.8–)1.5–3 cm long, slender, often channelled above, shortly pulvinate, puberulent to glabrous. Panicles 10–38 cm long, laxly branched, males with long flexuose branches; females usually erect with short branches, peduncles densely pubescent with short dense hairs intermingled with longer curved hairs. Flowers deep pink, 6–8 mm diam.; pedicels 2–3 mm long; calyx lobes broadly ovate or elliptic, dull red, 5–7 × 2.5–4 mm, pubescent outside; petals white, broadly ovate, ± shortly clawed, 2.5 × 3 mm; scales shorter, obovate, pubescent; disc glabrous; filaments 2–4 mm long; anthers 2 mm long, puberulent at sides; ovary ferruginous tomentose. Capsules sessile, rusty brown with pink flush, obovoid-obcordate, apiculatae, grooved at sutures, 3-lobed at apex, 1.8–2.4 × 1.6–2.7 cm, finely velvety tomentose; valves ± thin, densely villous inside; drying deeply and transversely wrinkled on outside; seeds enclosed to about the middle in a yellow cupular aril. **Fig. 4H, I, J, K, L, M, N.**

Border ranges between Queensland and New South Wales, on margins of rainforests.

Queensland: MORETON DISTRICT: About 3 km S of Advancetown on road to Springbrook, Oct 1973, *Sharpe & Dowling*; Tamborine Mt, Mar 1976, *Sharpe & Reynolds* 1895; Springbrook, Sep 1931, *Rudder*. **New South Wales:** Mooball S.F., SSE of Murwillumbah, Nov 1960, *Floyd & Hayes* (FOR. COMM. N.S.W.); Mebbin S.F., SW of Murwillumbah, Dec 1954, *Hayes* (FOR. COMM. N.S.W.).

C. newmanii is closely related to *C. flagelliformis* differing mainly in its habit and velvety obovoid-obcordate fruits. Its leaves are also larger and petiolules longer.

8. *Cupaniopsis serrata* (F. Muell.) Radlk., Sitzungsber. Bayer. Akad. 9:530 (1879), & in Engler, Pflanzenr. 98f:1183 (1933); Domin, Biblioth. Bot. 89:903 (1927); Francis, Aust. Rain-For. trees ed 3.252 (1970). Based on *Cupania serrata* F. Muell., Fragm. 3:43 (1863); Benth. Fl. Aust. 1:458 (1863); F. M. Bailey, Qd Fl. 1:291 (1899). **Type:** Pine River, Moreton Bay, *W. Hill* (MEL 84181, holotype).

Trees to 12m; young parts pale rusty pubescent; branchlets, petioles, rachises, peduncles rusty brown pubescent or puberulent with spreading villose hairs intermingled with short appressed hairs; lenticels dense in grooves of branchlets and base of petioles. Leaf (with petiole) 9.5–18(–26) cm long with 3–6(–8) leaflets on each side of rachis; petioles 4–7.5 cm long, semiterete, trisulcate; rachis 4.5–14.5(–17) cm long, bisulcate above; pinnae alternate, oblong-ovate tapering at tips, or narrowly elliptic, apex acuminate or shortly cuspidate; margins coarsely serrate or remotely serrulate, with usually sharp (spinulose) teeth; base obtuse, subtruncate or subacute, often slightly oblique, 6–12.5 × 2–5 cm, glabrous or puberulous especially on midribs and nerves below, semicoriaceous, subrigid; lateral nerves and reticulation coarse, strongly raised below; lateral nerves 10–16 pairs, ± patent (angle with midrib 60°–80°), usually terminating in marginal teeth; petiolules 1–5 mm long, pulvinate, pubescent. Inflorescences 1–6.5 cm long, racemiform, rarely with 1 or 2 branches, densely flowered with compact 3–5-flowered, subsessile cymules; bracts ovate-oblong sericeous. Flowers white, 6–8 mm diam.; sessile or subsessile (pedicel to 1 mm long); calyx lobes ovate or suborbicular 4–5 × 3.5 mm, pubescent outside; petals broadly ovate, 2.2 × 2 mm; disc glabrous; filaments 2 mm long, anthers 1.5 mm long; ovary densely villous. Capsules sessile, subglobose, apiculate, 1.2–1.6 × 1.5–1.8 cm, obtusely 3-lobed; valves thin, finely rusty brown velvety hairy outside, silky inside; slightly wrinkled when dry; seed nearly enclosed in orange aril. **Fig. 4 C, D.**

Southeastern Queensland: on rocky hillsides in rainforests, usually as an understorey tree.

WIDE BAY DISTRICT: S.F. 502, 8 km N of Gympie, Sep 1976, *Henderson*; Lagoon Pocket, *White* 9231; Imbil, Aug 1935, *White* 11405. MORETON DISTRICT: Eudlo Creek, Nov 1981, *Simmonds*; Blackall Range, Nov 1916, *White*.

9. *Cupaniopsis flagelliformis* (Bailey) Radlk., Fedde Repert. 20:31 (1924), & in Engler, Pflanzenr. 98f:1185 (1933); Domin, Biblioth. Bot. 89:904 (1927). Based on *Cupania flagelliformis* Bailey, Qd Bot. Bull. 8:73 (1893), & Qd Fl. 1:291 (1900). **Type:** Barron River, *E. Cowley* (BRI, holotype).

C. curvidentata (Bailey) Radlk., l.c. 31 (1924); 98f:1186 (1933). Based on *Cupania curvidentata* Bailey, Qd Agri. J. 5:483 (1899) and Qd Fl. 1:292 (1899). **Type:** Stony Ck, near Cairns, *L. J. Nugent* (BRI, holotype).

Trees 4–25 m high, to 30 cm girth; young parts densely pubescent; branchlets, petioles, rachises, petiolules pubescent to puberulent, indumentum of short yellow brown hairs intermixed with longer ± crispate hairs; lenticels pale, small, scattered on branchlets, usually clustered at base of petioles. Leaves with petiole 14.5–38(–45) cm long with (4–)5–7(–10) leaflets on each side of rachis; petioles 3–9(–10.5) cm long, semiterete, trisulcate at base; rachis 6–18(–26) cm long, subterete, bisulcate above; pinnae opposite or alternate, narrowly elliptic-oblong or subobovate; apex subacute, shortly cuspidate, obtuse, subtruncate, denticulate; margins serrate, serrulate or sinuate, usually regularly serrate (or serrulate) and nerved with parallel lateral nerves ending in serrations; teeth small and incurved, or coarse; bases obtuse, subacute or truncate, unequal, 3.5–14.5(–18) × 2–5.2 cm, upper surfaces drying paler, glabrous or puberulous especially on the nerves, lower ones pubescent or puberulent, midribs densely hairy; thinly coriaceous, drying subrigid; lateral nerves and reticulate venation raised below, lateral nerves 6–14 pairs, oblique (angle with midrib 45°–60°), parallel, regular; petiolules 1–8(–12) mm long, subterete, pulvinate. Panicles 5.5–35(–55) cm long, secondary peduncles long, slender, flexuose, 3.5–60 cm long, tertiary ones to 18 cm long bearing small clusters of 2–5-flowered sessile cymules; peduncles densely pubescent; bracts ovate, 4 × 2 mm, densely villous. Flowers pink, 7–9 mm diam., sessile; calyx lobes red, broadly obovate, 4–5 × 3.5–5 mm, pubescent or puberulent outside; petals broadly ovate 2–2.5 × 2–2.5 mm, scales nearly as long; disc glabrous; filaments to 1.5 mm long; anthers to 2 mm long. Capsules sessile, pink-brown, orange or yellow, broadly obovoid or ellipsoid, 3-lobed, grooved at sutures, 1.4–2.2 × 1.6–2.6 cm; valves thick, densely ± villous outside with yellow brown hairs, pubescent inside; drying deeply wrinkled outside; seed nearly enclosed in orange aril. **Fig. 4 R, S, T.**

North Queensland and on ranges in south-eastern Queensland and north-eastern New South Wales; usually at altitudes 680–1000 m, in rainforests on red basaltic soil.

Two varieties are recognisable:—

Secondary peduncles to 60 cm long, tertiary ones to 18 cm long. Capsule pinkish brown.

Leaflets to 10-paired. Petiolules 2–12 mm long. N. Qld..... var. **flagelliformis**

Secondary peduncles to 17 cm long, tertiary ones absent. Capsule yellow or orange.

Leaflets to 7-paired; petiolules 1–4 mm long. S.E. Qld & N.S.W..... var. **australis**

9a. Cupaniopsis flagelliformis var. flagelliformis

North Queensland: Cape York to Tully River.

Queensland: COOK DISTRICT: Rockingham Bay, *Dallachy* (MEL 98820, 98821); Telegraph Line, Oct 1870 & Nov 1870, *Dallachy* (MEL 98817, 98822); Harvey Creek, Oct 1947, *Flecker*; S.F.R. 185, Riding L.A. (17° 08'S, 145° 36'E), Oct 1976, *Irvine* 1799; S.F.R. 185, Lake L.A. (17° 09'S, 145° 36'E), Sep 1968, *Hyland* 1959 (QRS); S.F.R. 194 (R263) (17° 15'S, 145° 25'E), Nov 1963, *Hyland* 624 (QRS); S.F.R. 452 (17° 16'S, 145° 35'E), Sep 1968, *Hyland* 1912 (QRS); Atherton Tableland, Russel Rd, Pearamon (17° 2–'S, 145° 40'E), Sep 1977, *Endress, Gray & Nolan* 4246; Boonjie, W of Mt Bartle Frere, in 1962, *Webb & Tracey* 6576, & Oct 1929, *Kajewski* 1238; Glen Allyn, Atherton Tableland (17° 24'S, 145° 41'E), Dec 1978, *Webb & Tracey* 13216. Warrammi Hill, W of North Johnstone River, Nov 1982, *Jessup* 510. NORTH KENNEDY DISTRICT: Tully Falls, S.F.R. 251, Oct 1953, *Volck*;

9b. Cupaniopsis flagelliformis var. australis S. T. Reynolds, varietas nova; a var. *flagelliformis* imprimis differt fructibus luteis subrotundis, petiolulis et ramulis paniculae brevioribus.

Typus: New South Wales: Wiangaree S. F., 8 Jan 1981, *L. Bird* (BRI, holo), Dec 1982, *L. Bird* (BRI, para).

MORETON DISTRICT: Roberts Plateau, Jan 1919, *White*. New South Wales: Whian Whian S.F., May 1954, *Hayes* (FOR. COMM. N.S.W.); Rocky Creek, Whian Whian S.F., May 1956, *Floyd & Hayes* (FOR. COMM. N.S.W.); Wiangaree S.F., Jan 1980, *Bird*; Lynch's Creek, Wiangaree S.F., Nov 1963, *Floyd & Hayes* (FOR. COMM. N.S.W.); The Risk, Upper Richmond River, in 1949, *Jones* (FOR. COMM. N.S.W.); Wilson Creek, Boat Harbour near Lismore, Oct 1976, *Floyd* (FOR. COMM. N.S.W.); Victoria Park, 8.1 km S of Alstonville, Nov 1971, *O'Hara & Coveny* 3489.

10. Cupaniopsis tomentella (F. Muell. ex Benth.) S. T. Reynolds, comb. nov. Based on *Cupania tomentella* F. Muell. ex Benth., Fl. Aust. 1:458 (1863); F. Muell., Fragm. 9:94 (1875); F. M. Bailey, Synop. Qd Fl. 1:76 (1883), & Qd Fl. 1:292 (1899). **Type:** Scrubs near Ipswich, Moreton Bay, *W. Hill* (MEL 84182, holo).

Cupaniopsis serrata var. *tomentella* (F. Muell. ex Benth.) Domin, Biblioth. Bot. 89:903 (1927).

Cupaniopsis serrata f. *tomentella* (F. Muell. ex Benth.) Radlk., Sitzungsber. Bayer. Akad. 9:585 (1879), & in Engler, Pflanzenr. 98f:1184 (1933).

Trees to 10 m; young parts, branchlets, petioles, rachises, petiolules and peduncles densely tomentose with pale brown spreading ± crispate hairs; branchlets fluted, lenticellate; lenticels elliptic, dense in the grooves. Leaves with petiole 12.5–22 cm long with 3 or 4(–5) leaflets on each side of rachis; petioles 3.5–7 cm long, subterete, pulvinate; rachis 6–13 cm long, terete, often bisulcate above; pinnae alternate, elliptic, oblong or subobovate, apex rounded, obtuse, truncate, retuse or often denticulate; margins subentire, or sinuate with remote minute serrulations especially towards apex, base obtuse or subacute usually oblique, 4–9 × 2–4 cm, glabrous above or midribs and nerves puberulent, lower surfaces puberulent with pubescent midribs; semicoriaceous: lateral nerves 6–12 pairs, irregular, angle with midrib about 45°, reticulatae venation dense, prominent both surfaces; petiolules slender, channelled above, 7–10 mm long. Panicles erect 2–9 cm long, usually divaricately branched with racemose branches 2–5.5 cm long; bracts broadly ovate 2 × 2–3 mm long, sericeous outside. Flowers greenish white 7–8 mm diam.; pedicels to 1 mm long; calyx lobes elliptic or suborbicular 5–6 × 4 mm, pubescent outside; petals broadly obovate 2.5 × 2 mm, puberulent outside; scales obovate, as long as petals; filaments 2–5 mm long, anthers 2 mm long, puberulent; ovary densely tomentose. Capsule sessile, depressed ellipsoid, flat on top and at base, with sunken style, drying obtriangular, 2–2.5 × 3–4 cm, orange-yellow with red flush at base; obscurely 3–(or 4)–lobed, slightly grooved at sutures, pale yellow tomentose outside with dense short hairs; valves thick, rugose, drying deeply and irregularly wrinkled outside; seeds dark brown, shiny, ± covered by thin, pale yellow aril with repand distal end. **Fig. 4 A, B.**

South-eastern Queensland, usually in dry scrubs.

WIDE BAY DISTRICT: Bundaberg, Dec 1930, *Michael* 1816. MORETON DISTRICT: Roadvale, Jan 1934, *Michael* 2035; Midway between Mt Edwards and Kalbar on Lake Moogerah — Fassifern Rd., Dec 1978, *Elsol & Stanley* 502; Mt French, Jan 1982, *Bird*.



Fig. 4. *CUPANIOPSIS*. *C. tomentella*: A. habit ($\times \frac{1}{2}$). B. fruit ($\times 1$), dried material. *C. serrata*: C. fruit ($\times 1$). D. leaflet margin ($\times 1$). *C. foveolata*: E. leaflet margin ($\times 1$). *C. anacardioides*: F. flower, showing long pedicel ($\times 3$). G. fruit ($\times 1$). *C. newnani*: H. flower, showing short pedicel ($\times 3$). I. petal with scales, no crest ($\times 6$). J. large sepal ($\times 6$). K. small sepal ($\times 6$). L. leaflet, showing long petiolule ($\times \frac{1}{2}$). M. fruit ($\times 1$). N. seed, showing aril ($\times 1$). *C. wadsworthii*: O. leaf (one pair of leaflets) ($\times \frac{1}{2}$). *C. shirleyana*: P. leaf ($\times \frac{1}{2}$). *C. fleckeri*: Q. leaf ($\times \frac{1}{2}$). *C. flagelliformis*: R. inflorescence ($\times 1$). S. leaflet ($\times 1$). T. fruit ($\times 1$).

SARCOPTERYX

Sarcopteryx Radlk., Sapind. Holl.-Ind. 127 (1879), & in Engler, Pflanzenr. 98f: 1232–1238 (1933). **Type:** *S. squamosa* (Roxb.) Radlk., based on *Sapindus squamosus* Roxb. (lectotypus novus).

Trees with saponin in bark, twigs and leaves; branchlets terete, ribbed towards apex, usually dark brown or rusty hairy; indumentum of simple hairs. Leaves petiolate, paripinnate; leaflets 1–4–paired, entire, lower surfaces with clavate glandlets; lateral nerves arched, raised below, usually widening near midrib and forming domatia-like pockets; petiolulate. Inflorescences axillary, thyrsoïd, paniculiform with racemose branches; cymules 2– or 3– (rarely more)–flowered; bracts long and narrow. Flowers small, regular; males and females usually on same inflorescences; pedicel articulate below middle; calyx shortly cupular, 5–lobed, lobes ovate, imbricate at base; petals 5, broadly ovate, obovate or suborbicular, shortly clawed, slightly papillose; inside with 2 densely villous, crested scales; scales nearly as long as petals; crests usually small, inconspicuous; disc annular, fleshy, glabrous; stamens 7 or 8, filaments filiform, exerted, hairy; anthers papillose; ovary obovoid, 3–locular with solitary ovule in each cell; style filiform, persistent. Capsules sessile or stipitate; slightly fleshy, obovoid or broadly ellipsoid, cuspidate (residual style), obtusely angled or winged at sutures (young ones usually triquetrous), 3–locular; 3–seeded; loculicidally 3–valved from apex; valves coriaceous, drying ± woody, glabrous inside, glabrous or hairy outside; seeds usually ellipsoid; aril thin, usually enclosing seed.

Eleven species: Eastern Malaysia, New Guinea to Australia; five (three new) in Australia (eastern).

1. Capsule wingless, sometimes obtusely keeled at sutures 2
 Capsule with flat, acute wings 3
2. Capsule narrowing at base into a short stipe, obovoid slightly carinate or angled at sutures. Indumentum of dense or sparse ± straight dark brown or pale hairs. Leaflets narrowly and obliquely elliptic, 3·5–9·7 × 1·2–4 cm; reticulation fine, lax 1. ***S. stipata***
 Capsule sessile, subglobose or transversely ellipsoid, keeled at sutures. Indumentum of dense, ± crispate, ferruginous or hoary hairs. Leaflets elliptic or subovate-oblong, 5·8–12·5 × 2–4·5 cm; reticulation dense, prominently raised when dry 2. ***S. reticulata***
3. Capsule golden yellow often with pink flush, tomentose to puberulent. Leaflets ± rigid, margins usually slightly recurved. Bracts slender and long, erect 3. ***S. montana***
 Capsule pinkish-red or red, pubescent or glabrous. Leaflets and bracts not as above 4
4. Leaflets 1– or 2(–3)–paired, (3·5–)7–18·5 × (1–)2·5–6·5 cm, acute or acuminate; hairy especially below. Inflorescences with tight closely arranged dense clusters of cymules. Capsule broadly obovoid or ellipsoid with fairly thin wings 4. ***S. martyana***
 Leaflets 3– or 4–paired, 3·5–10·7 × 1·3–4·3 cm, usually long acuminate; glabrous or puberulous below. Inflorescences with lax scattered cymules. Capsules broadly ovoid or ellipsoid, apiculus conical at base; wings thick, coriaceous 5. ***S. acuminata***

1. ***Sarcopteryx stipata*** (F. Muell.) Radlk., Sitzungsber. Bayer. Akad. 9:544 n 635 (1879) & in Engler, Pflanzenr. 98f:1237 (1933) (“stipitata”); Domin, Biblioth. Bot. 89:906 (1927); Francis, Aust. Rain-For. trees ed 3.256 (1970). Based on *Cupania stipata* F. Muell., Fragm. 2:75 & 175 (1860–61); 3:12 (1862). **Type:** Clarence River, *Dr H. Beckler* (MEL 84174, holotype).

Ratonia stipitata (F. Muell.) Benth., Fl. Aust. 1:461 (1863); F. M. Bailey, Qd Fl. 1:297 (1899).

Trees to 10(–25) m, young parts dark brown velvety hairy; branchlets, petioles, rachises, petiolules, peduncles, pubescent with ± straight, black or dark brown to pale hairs or glabrous. Leaves with petiole 10–21 cm long with (2–)3 or 4 leaflets each side of rachis; petioles 2–3·3 cm

long, semiterete, shortly and broadly pulvinate at base; rachis (2–)4.5–7 cm long, subterete; pinnae opposite or alternate, obliquely and narrowly elliptic or subobovate or ovate-oblong, narrowing at both ends, apex acuminate (often abruptly so), base oblique, obtuse or acute, shortly decurrent, 3.5–9.7 × 1.2–4 cm, glabrous or puberulous especially towards base of midribs below, shiny, coriaceous, subrigid; lateral nerves 6–13 pairs, arched and ascending, laxly and very finely reticulate; petiolules 5–10 mm long, semiterete, pulvinate. Inflorescences racemiform or paniculiform 3–14 × 1–8 cm, laxly flowered, peduncles pubescent to puberulent with scattered 2 or 3-flowered cymules or flowers solitary especially towards apex. Flowers 3.5–5(–7) mm diam.; pedicels 2–6 mm long, puberulent; calyx 2 × 4.5 mm, lobes ovate-oblong, obtuse, 1.5–2 × 1 mm, sparsely pale brown appressed hairy outside, pubescent inside; petals broadly ovate 1.7–2.5 × 1.5 mm, scales as long, hairy, crests papillose; filaments 2.5–3.5 mm long, shortly hairy; ovary and style sparsely hairy; styles 2–2.5 mm long. Capsules pinkish red, obovoid, narrowing into short broad stipe (especially when young), angular and carinate at sutures especially towards base, cuspidate at apex, 1.3–2.4 × 1–2 cm; valves ± fleshy, thickly coriaceous; seeds brown; aril yellow, bilobed, eroded at margin; stipe 2–4 mm long (longer when immature). **Fig. 5 E, F.**

Mt Cooroy, south-eastern Queensland to Bulga Plateau NW of Taree, New South Wales; at edge of subtropical montane forests, usually on rocky soil.

Queensland. WIDE BAY DISTRICT: Summit of Mt Cooroy, S of Tewantin-Cooroy Road, Jun 1979, *Jessup & Sharpe* 204. MORETON DISTRICT: Summit of D'Aguiar Ra near Mt Glorious, Nov 1972, *Lebler & Durrington*; Mt Glorious, Dec 1980, *Byrnes & Jessup* 4061; Beechmont, Dec 1978, *Jessup & Reynolds* 165; Upper Currumbin Ck, 2 km ESE of Boyd's Butte, Aug 1976, *McDonald & Whiteman* 1567. **New South Wales:** Wiangaree S.F., Tweed Range, about 21 km NE of Kyogle, Oct 1969, *Schodde* 5619; Gibberrgunyah Range, Dec 1953, *Smith* 5121.

Common name: Corduroy Tree or Steelwood.

2. *Sarcopteryx reticulata* S. T. Reynolds, species nova *S. martyanae* primo adpectu simile sed foliolatis coriaceis, utrinque manifeste reticulatis, inflorescentiis laxis, fructibus carinatis ealatis; accedit *S. stipatae* autem indumento plerumque dense ferrugineo vel incano, pilis crispatis et fructibus sessilibus differt. **Typus:** Cook District: Black Mt Rd, Kuranda, Dec 1963, *L. J. Webb & J. G. Tracey* 8222 (BRI, holo).

Trees 6–25 m high, to 25 cm girth; young parts loosely rusty tomentose; branchlets, petioles, rachises, petiolules subferrugineous or hoary tomentose with usually ± crispate hairs. Leaves (with petiole) (11–)16–28 cm long with 2 or 3(–4) leaflets each side of rachis; petioles 1.8–4(–12) cm long, semiterete, broadly, shortly pulvinate at base; rachis 2–4.5(–13) cm long, semiterete; pinnae alternate, elliptic-oblong, subobovate-elliptic or subovate-oblong, apex acuminate (occasionally abruptly acuminate) or acute, base acute or subobtuse, oblique, decurrent, 5.8–12.5 × 2–4.5 cm, glabrous above, puberulent or subglabrous below; midribs pubescent to subglabrous; coriaceous, shiny above; lateral nerves 8–12 pairs, obliquely arched ascending, with domatia-like pockets in some of their axils and raised ± dense reticulation between them; petiolules 4–7 mm long, subterete, pulvinate. Panicles 3.5–16 cm long, to 13 cm wide, laxly branched and flowered; peduncles rusty tomentose, branches slender, with scattered 2- or 3(–5)-flowered cymules towards the base and solitary flowers towards top; bracts ovate-oblong, 2.5 × 1 mm, densely rusty villous outside. Flowers cream, 4–5 mm diam.; pedicels 2.5–5 mm, pubescent; calyx lobes ovate-oblong 2 × 1 mm, yellow brown pubescent or puberulent; petals suborbicular, often clawed, 1.5–2 × 1.5–2 mm, scales as long, broad, pubescent; crests thin; filaments 3–6 mm long; ovary hoary tomentose; style 5–6 mm long. Capsules sessile, dull pink to red, 1–1.8 × 1–1.8 cm, subglobose or broadly subovoid, cuspidate at apex with slender apiculum to 5 mm long; carinate at sutures (obtusely winged in young ones); valves coriaceous, 2–3 mm thick. **Fig. 5 I, J.**

North Queensland: Annan River to Atherton Tableland; often along creeks, at margins of rainforests.

COOK DISTRICT: Upper Parrot Creek, Annan River, Sep 1948, *Brass* 20297; about 29 km NNW of Daintree, Nov 1967, *Boylard & Gillieatt* 502; Noah Ck, between Daintree R and Cape Tribulation (16° 10'S, 145° 20'E), Oct 1967, *Hyland* 1077; S.F.R. 143, Little Mossman L.A. (16° 32'S, 145° 22'E), Nov 1978, *Gray* 1137 (QRS); Range Rd, Atherton Tableland, Nov 1929, *Kajewski* 1325; S.F.R. 607, Bridle L.A. (16° 58'S, 145° 36'E), Sep 1978, *Gray* 1022.

The new species is very similar to *S. martyana* (F. Muell.) Radlk., but differs from it in its coriaceous prominently nerved and densely reticulate leaflets, lax inflorescences, carinate, wingless fruits. It approaches *S. stipata* (F. Muell.) Radlk. in leaves and inflorescences but differs in its densely ferrugineous or hoary, ± crispate hairs and sessile fruits.

3. *Sarcopteryx montana* S.T. Reynolds, species nova a *S. martyanae* foliolatis parvioribus aliquantum rigidis marginibus recurvatis praeditis et fructibus majusculis aureis tomentosis differt.
Typus: Cook District: 23.2 km up Mt Lewis Rd, turn off from Mt Molloy-Mossman Rd (16° 33'S, 145° 17'E), alt 1000 m, 31 Jan 1981, *L. W. Jessup & J. R. Clarkson* 293 (BRI, holotypus).

Trees to 15 m high 20 cm girth; young parts, peduncles usually rusty brown tomentose; branchlets, petioles, rachises, petiolules dirty or rusty brown crispate tomentose to puberulent; lenticels small, scattered on branchlets. Leaves (with petiole) 7.5–16.5(–20) cm long with 2 (or 3) pairs of leaflets; petioles 1–3.5 cm long, semiterete, broad at base; rachis 1–3.5(–7) cm long, semiterete; pinnae usually opposite, elliptic or subobovate, slightly wider above middle; apex acute or abruptly, shortly acuminate; margins often slightly recurved; base oblique or suboblique, acute or subobtuse, 3.5–9.1 × 1.6–4.1 cm, upper surfaces rough, glabrous or puberulous, lower ones puberulent especially on nerves; midribs pubescent, especially below; coriaceous, slightly rigid; lateral nerves 7–9 pairs, arched ascending, raised below, often bullate between the nerves; reticulate venation fine, lax, indistinct above; petiolules 3–10 mm long, semiterete. Panicles 6–11 × 2–7 cm, branches racemiform; bracts slender, linear-ovate-oblong, to 7 × 1.5 mm, thick, erect, crispate tomentose outside. Flowers 5 mm diam.; pedicels to 2 mm long; calyx lobes ovate, obtuse, 2 × 1.5 mm, densely villous outside; petals obovate, shortly clawed, 2.5 × 2 mm, pubescent inside, scales longer or as long, densely villous; crests slender, thin, usually hidden by hairs; filaments densely hairy. Capsules sessile, golden or dirty yellow, often with pink flush, broadly obovoid or ellipsoid, 1.7–2.2 × 1.4–2.4 cm, cuspidate at apex, (apiculum conical at base, to 8 mm long especially when young), 3-gonous with flat dorsal wings from apex to base, rusty golden crispate tomentose to puberulous; wings compressed 3–7 mm wide, coriaceous; valves coriaceous. **Fig. 5 K.**

Northern Queensland: usually in montane rainforests (altitudes 450–1200 m), from Thornton Peak to Mt Spurgeon; on exposed rocky ridges.

COOK DISTRICT: Thornton Peak, N.P.R. 164 (16° 10'S, 145° 20'E), Nov 1972, *Hyland* 7086, & Nov 1940, *Flecker*; S.F.R. 143 (16° 30'S, 145° 16'E), May 1973, *Hyland* 2789; May 1976, *Hyland* 3422; Feb 1977, *Gray* 283; S.F.R. 143, North Mary L.A., (16° 30'S, 145° 15'E), Dec 1974, *Hyland* 3148; Mt Spurgeon, Sep 1936, *White* 1624.

The new species differs from *S. martyana* in its smaller subrigid leaflets with recurved margins and its rather large golden tomentose fruits. It is probably close to *S. coriacea* Radlk. (ex descr.) from New Guinea.

4. *Sarcopteryx martyana* (F. Muell.) Radlk., Sapind. Holl.-Ind. 58 (1879); & in Engler, Pflanzenr. 98f:1237 (1933); Domin, Biblioth. Bot. 89:906 (1927). Based on *Cupania martyana* F. Muell., Fragm. 5:6 (1865). **Type:** Rockingham Bay, *Dallachy* (MEL 84173; 84179–80 holo).

Ratonia martyana (F. Muell.) Bailey, Qd Fl. 1:298 (1899).

Trees 7–20 m high to 25 cm girth; young parts, petioles, rachises, petiolules, peduncles and usually lower surfaces of leaves densely ferruginous hairy with loose villose or crinkly spreading hairs; branchlets dark brown velvety hairy; lenticels small. Leaves (with petiole) 12.5–25(–30) cm long with 1–2(–3) leaflets each side of rachis; petioles 1–5.5 cm long, subterete, broadly and shortly pulvinate; rachis 2.5–8.5 cm long, terete; pinnae opposite to alternate, ovate-oblong or ovate-elliptic or elliptic-oblong, tapering to acute-acuminate apex or abruptly acuminate; base broad, oblique, obtuse or subacute, (3.5–)7–18.5 × (1–)2.5–6.5 cm, glabrous or puberulous above, pubescent or puberulent below, ± coriaceous, midribs and margins of leaflets usually densely red villose hairy; lateral nerves 8–14 pairs, obliquely arched and ascending, strongly raised below, with lax reticulate venation between them, often drying somewhat bullate; petiolules 5–12 mm long, subterete, pulvinate. Panicles 4.5–18 × 2.5–21 cm, copiously flowered with closely arranged dense clusters of shortly stalked cymules, cymules usually more than 3-flowered; bracts ovate-oblong 1.5–2 × 0.5 mm. Flowers 3.5–5 mm diam.; pedicels 2–4 mm long; calyx lobes ovate, 2 × 1–1.2 mm, densely rusty villous on outside; petals obovate, 2.2–2.5 × 1.5 mm, scales as long, densely hairy on margins, crests slender; filaments 2.5–3 mm long; ovary sessile, densely villous; styles 3–4 mm long, pubescent. Capsules sessile, pink or red, 1–1.4 × 1.2–1.8 cm, broadly obovoid, depressed above, cuspidate, 3-gonous; narrowly winged at angles; wings ± fragile, flat 3–4 mm wide; valves ± woody; seed with thin, yellow ventral aril. **Fig. 5 G, H.**



Fig. 5. *SARCOPTERYX*. *S. acuminata*: A. habit, with flowers ($\times 1$). B. flower ($\times 3$). C. petal ($\times 6$). D. fruit ($\times 1$). *S. stipata*: E. habit, with fruit ($\times 1$). F. open fruit, showing aril and seed ($\times 1$). *S. martyana*: G. inflorescence ($\times 1$). H. fruit ($\times 1$). *S. reticulata*: I. flower ($\times 3$). J. fruit ($\times 1$). *S. montana*: K. habit, with fruit.

Northern Queensland: Atherton Tableland to Eungella Ra.; in rainforest margins.

COOK DISTRICT: Crystal Cascades, 12 km N of Cairns, Nov 1967, *Boyland & Gilleiatt* 352; Pine Ck, Forestry Rd-Malbon Thompson Ra (17° 04'S, 145° 52'E), *Webb & Tracey* 13273; S.F.R. 185, Ridings L.A. (17° 08'S, 145° 36'E), Dec 1976, *Irvine* 1810; Jan 1979, *Gray* 1236 (QRS); S.F.R. 194, Scrubby L.A. (17° 17'S, 145° 47'E), May 1971, *Dockrill* 100; Lacey's Ck (17° 22'S, 146° 04'E), Nov 1951, *Smith* 4944; Tinaroo Range near Danbulla, Oct & Nov 1948, *Byrne* 1 & 2; S.F.R. 1137 (17° 50'S, 146° 05'E), Oct 1968, *Hyland* 2092 (QRS). NORTH KENNEDY DISTRICT: Mt Fox, Sep-Dec 1949, *Clemens*; Dotswood Holding (19° 10'S, 146° 22'E), Nov 1979, *Hyland* 10076; Jarra Ck near Tully, Nov 1963, *Hyland* 691, SOUTH KENNEDY DISTRICT: Eungella Range via Mackay, Oct 1922, *Francis*.

5. *Sarcopteryx acuminata* S. T. Reynolds, species nova a *S. montanae* fructibus roseis, glabrioribus, inflorescentibus grandioribus, foliolatis plerumque apice attenuatis acuminatis et marginibus non recurvatis differt. **Typus:** Cook District: S.F.R. 755, near Topaz, Gosshalk L.A. (17° 23'S, 145° 47'E), Dec 1977, *B. Gray* 822 (BRI, holotype; QRS, iso).

Small trees 3–15 m; young parts pale rusty velvety hairy; branchlets, petioles, rachises, petiolules with loose, ± crispate, rusty or hoary hairs, pubescent to glabrous. Leaves (with petiole) (6.5–)9.5–24 cm long, with 3–4(–5) leaflets each side of rachis; petioles (1.5–)2.5–6.5 cm, subterete, broadly and shortly pulvinate; rachis (1.5–)4–10 cm, semiterete; pinnae alternate, elliptic, elliptic-ovate or ovate-oblong, subfalcate, apex acuminate, subcaudate or acute, base oblique, slightly rounded, obtuse or subacute, shortly decurrent 3.5–10.7 × 1.3–4.3 cm, glabrous or lower surfaces puberulent, midribs usually puberulent; shiny above, coriaceous; lateral nerves 8–10 pairs, subpatent, arched and ascending at tips; reticulation lax, prominent; petiolules (2–)5–14 mm long, terete, pulvinate. Panicles usually much longer than leaves, 4.5–23 cm long, to 20.5 cm wide; peduncles rusty crispate tomentose; branches laxly flowered, with 2– or 3–flowered cymules; bracts subulate, 3 × 0.5 mm. Flowers 5–6 mm diam.; creamy yellow, slightly perfumed; pedicels 3–5 mm long, pubescent; calyx lobes narrowly oblong-obovate, usually erect, concave towards apex, 2–2.5 × 0.7–1 mm, pubescent or puberulent outside, pubescent inside; petals elliptic-oblong, obtuse, 2.5 × 1.2 mm, subglabrous outside, scales half as long, pubescent on margins; crests usually minute; filaments 3–6 mm long, densely hairy. Capsules sessile, deep pink, 1.4–1.8 × 1.4–1.8 cm, broadly ovoid or transversely ellipsoid, cuspidate at apex; apiculum to 4 mm long; 3–(or 4)–lobed, dorsally winged with flat coriaceous wings extending from apex to base of fruit, puberulous or glabrous; wings 3–4 mm wide. **Fig. 5 A, B, C, D.**

Northern Queensland in rainforests often at higher altitudes.

COOK DISTRICT: Shipton's Flat (15° 40'S, 145° 10'E), Sep 1948, *Brass* 20227; Mt Finnigan (15° 40'S, 145° 10'E), Sep 1948, *Brass* 20114 & 20062; S.F.R. 755, Boonjie L.A. (17° 23'S, 145° 47'E), near Topaz, Sep 1977, *Gray* 704; S.F.R. 310, Swipers L.A. (17° 23'S, 145° 46'E), Sept 1978, *Hyland* 9758.

The species differs from *S. montana* in its more or less glabrous pink fruits; larger inflorescences, and leaflets usually with attenuate acuminate tips; margins not recurved.

DISTICHOSTEMON

Distichostemon F. Muell., in Hook., J. Bot. Kew Gard. Misc 9:306 (1857). **Type:** *D. phyllopterus* F. Muell. (= *D. hispidulus* (Endl.) Baill.)

Shrubs, usually low and hispid hairy; branchlets slender, young ones densely pale hairy, indumentum of simple, spreading usually hispid hairs. Leaves simple, alternate, obovate, elliptic or oblong, margins entire, serrulate or crenulate; surfaces usually soft and hairy; petioles slender. Inflorescences axillary or terminal, slender, open racemes or ± paniculate or flowers solitary; bracts slender. Flowers polygamous, monoecious or dioecious, regular, small; pedicellate; sepals 5–10, elliptic or ovate-elliptic-oblong, usually narrow and with distinct midrib, slightly imbricate; petals absent; disc small; stamens 8–74, usually irregularly 2–many seriate; free; filaments glabrous; anthers linear, elongate, often falcate, apiculate with prominent glanduliform apiculum; hairy especially on margins; ovary oblongoid or obovoid, 3–8–lobed, usually densely pubescent; 3–8–locular; ovules two in each cell; style filiform, simple, often twisted; stigma simple or minutely 2–4–lobed. Capsules usually lobed, obovoid or oblongoid, usually chartaceous, inflated, usually hairy; lobes 3–8, loculicidally dehiscent; valves usually dorsally produced into broad or narrow, often herbaceous wings, or winged only at top of fruit; septa membranous, shiny, pubescent; seeds 2 in each loculus, shiny, globose, with marked annular, disciform, tumid base; exarillate.

Six species (two new) endemic to Australia (Western Australia, Northern Territory and Queensland).

The genus is quite complex and it is not easy to distinguish some of the species without using a set of characters. Most of the collections seen were inadequate. The following key is based mostly on fruit characters and stamen number, as leaves vary quite considerably within the species.

1. Glabrous or puberulous shrubs. Leaves usually acute, subacute or obtuse at apex, serrate or serrulate at margins. Capsule usually glabrous, obtriangular with broad triangular wings, veined. Sepals long and narrow, often lobed 1. **D. filamentosus**
Densely hairy shrubs rarely glabrous, then not with above set of characters. Leaves usually broad at apex, obtuse, retuse, truncate or mucronate; margins entire or crenulate. Capsule usually hairy, variously shaped and winged, not veined. Sepals not as above, elliptic or ovate-oblong 2
2. Stamens less than 30. Inflorescences lax, few-flowered racemes or flowers solitary on long slender stalks often longer than leaves 3
Stamens more than 30. Inflorescences usually densely flowered, racemose or paniculate, if flowers solitary then stalks erect, usually stout and shorter than leaves 6. (**D. hispidulus** complex)
3. Capsule inflated, not lobed, with 3 or 4 minute apical wings narrowing and forming a ridge to about middle of fruit. Sepals broadly elliptic. Fruits on long erect stalks, 4–8 together in short racemose infructescence, rarely solitary 2. **D. barklyanus**
Capsule 3–8-lobed, with broad or narrow wings from apex to base. Sepals usually narrow and long, linear-ovate-oblong. Fruits solitary on long slender stalks or 2–7 together in usually long racemose infructescence 4
4. Capsule 3-lobed, obtriangular, wings wider slightly above middle. Leaves 1–4.2 × 0.6–1.7 cm, hairy rarely glabrous. Fruits usually solitary on long slender stalks, much longer than leaves; stalks (15–)50–85 mm long. Stamens 10–12(–15); sepals 6–10 3. **D. dodecandrus**
Capsule 4–8-lobed, broadly obovoid or ellipsoid, wings wider towards apex. Leaves (3–)5.5–14.5 × 1–4.2 cm hairy. Fruits in racemose infructescences, occasionally solitary on long slender stalks; stalks 12–25(–60) mm long. Stamens 8–24; sepals 5–7 5
5. Capsule 4–8-lobed, narrowly winged (wings to 3 mm wide at widest part), hispid pubescent. Leaves 5.5–9 × 1–2.3 cm, shortly petioled; petiole 1–2(–5) mm long. Flowers 7–9 mm diam.; pedicel to 4 mm long; stamens 8–10, anthers falcate
4. **D. malvaceus**
Capsule 4- or 5-lobed, broadly winged (wings wider at apex, 6–8.5 mm wide), villose tomentose. Leaves (3–)5–14.5 × (1.2–)2–4.2 cm, long petioled; petiole 4–15 mm long. Flowers 8–12 mm diam.; pedicel 4–21 mm long; stamens 14–24, anthers not falcate 5. **D. arnhemicus**
6. Wings of capsule very small, usually minute, broad towards apex, narrowing and forming a slender ridge to base of fruit. Broadest part of wing 2–4 mm wide. Capsule 0.8–1(–1.2) × 0.6–1(–1.5) cm 6c. **D. hispidulus** var. **aridus**
Wings of capsule either erect or divaricate, broad only towards apex of fruit; or wings broad above middle gradually narrowing from apex to base of fruit. Broadest part of wing 4–8(–14) mm wide. Capsule 0.8–1.2 × 1.2–2.5 cm 7
7. Capsular wings ± triangular, usually wider above middle narrowing to base. Young fruits ± triquetrous 3-lobed or blunt at apex. Flowers 6–8 mm diam. Fruits on slender stalks, in racemose infructescences; sepals persistent. Leaves soft and velvety, rarely scabrellus (1.8–6.8 × 0.8–2.4 cm), usually clustered
6a. **D. hispidulus** var. **hispidulus**
Capsular wings long and narrow, either erect or divaricate then wider than long; wings broad in upper third abruptly narrowing and forming a ridge to base of fruit. Young fruits ± oblongoid with 3 large, flat blunt apical wings. Flowers 8–14 mm diam. Fruits in racemose infructescences or solitary on erect, stout stalks; sepals usually deciduous. Leaves mostly harsh and coarse, usually pubescent (2–9.2 × 1–3.4 cm), not clustered 6b. **D. hispidulus** var. **phyllopterus**

1. *Distichostemon filamentosus* S. Moore, J. Linn. Soc. Bot. 45:197 (1920). **Type:** Northern Territory, Palmerston (Darwin), 14 Jun 1886, *Rev. T. S. Lea* (BM, holo).

Usually small shrubs with woody rootstock, 0.25–1.5 m; young parts puberulent or pubescent with fine, long slightly curved antrorse white hairs; branchlets and leaves puberulous to glabrous. Leaves narrowly subelliptic or elliptic-oblong or subobovate, abruptly acute, subacute or obtuse at apex, margins usually with few coarse serrations or serrulations, or entire; base acute narrowing and slightly decurrent into petioles, 3.3–10(–14) × 0.8–2.8(–4) cm, slightly viscid and resin-dotted when young; lateral nerves 4–12 pairs, obliquely arched, ascending, often drying slightly impressed above; petioles 0.5–2.5 cm long, slender, pubescent to glabrous. Inflorescences terminal, open racemes to 7 cm long, 2–6-flowered; or flowers solitary, axillary or at top of branchlets; peduncles pubescent to glabrous; bracts subulate. Flowers to 12 mm diam.; pedicels 6–18 mm long, pubescent to glabrous; sepals 6–8, longer than stamens, usually linear and long and often lobed, elliptic-oblong acuminate, midrib prominent, 6–8 × 1–2.2 mm, herbaceous (remaining green in fruit), puberulous or glabrous; stamens (from few poor specimens seen) 24–34, filaments shorter or as long as anthers, 2–3.5 mm long, anthers 3–4 mm long; styles to 2 cm long. Capsules 3-lobed, broadly obovoid or obtriangular, winged from near apex to base, 1.1–1.8 × 1.8–2 cm, wings divaricate or suberect, obtusely triangular, broad near apex and middle abruptly narrowing to base of fruit, 0.8–1.4 × 0.8–2.5 cm, herbaceous; seed-bearing portion broadly elipsoid, puberulous with soft curved whitish hairs or glabrous, delicately veined. Persistent sepals half or more the length of capsule, usually reflexed. **Fig. 6 C.**

Northern Territory; Darwin-Gulf area, usually in eucalypt forests, in disturbed areas, on deep sandy soil on gentle slopes and flats.

Northern Territory: Stuart H/way, 21 km SE of Darwin (12° 29'S, 131° 01'E), Jun 1964, *Nelson* 1115 (NT); Nourlangie Safari Camp (12° 57'S, 132° 48'E), Feb 1973, *Lazarides* 7891 (NT); Rum Jungle, Jan 1967, *Byrnes* N49 (NT); Browns Prospect, Rum Jungle, Apr 1967, *Ridley* 15; McCallum's Ck (13° 05'S, 130° 31'E), Jul 1953, *Bateman* 539 (NT).

NOTE: As most of the collections (except Rum Jungle) are from regrowth after fires more are necessary to see if the above characters are constant if plants have not been disturbed.

2. *Distichostemon barklyanus* S. T. Reynolds, species nova *D. hispidulo* var. *arido* affinis a qua imprimis differt alis minutis saepe rudimentalis non sisi sitis in super capsulis apicem versus et staminibus paucis sepalis latioribus praeditus. **Typus:** Northern Territory: 48 km S of Elliott, Stuart Highway, Feb 1969, *J. Must* 472 (BRI holo, NT iso).

Small spreading shrubs 0.7–1 m; bark fibrous; young parts, branchlets pubescent with straight and curved hairs. Leaves often clustered on branchlets, elliptic or narrowly obovate-oblong, subtruncate, mucronate or obtuse at apex; margins entire or ± crenulate; bases subacute often slightly decurrent into petioles, 2.5–6 × 1–2.2 cm, usually coarse, scabrelous and slightly viscid, rarely thick and velvety, upper surfaces pubescent to sub-glabrous, lower ones pubescent or puberulent; usually with coarse nerves and reticulation, lateral nerves 6–11 pairs, oblique, distinct; petioles 3–7 mm long, pubescent. Inflorescences terminal, short racemes, 2–4 cm long, 4–7-flowered or flowers rarely solitary; peduncles pubescent, short. Flowers 4–6 mm diam.; pedicels 2–7 mm long, slender; sepals 5–7, broad, as long as stamens, elliptic-ovate, acute 3–5 × 1–2 mm, midvein prominent; pubescent or puberulent, persistent; stamens 10–22, filaments 1–3.5 mm long, anthers 1.5–2.5 mm long; ovary oblongoid with 3–4 minute lobes at the top; style 4–12 mm long. Capsule not lobed; usually 4–8 together in a short racemose bunch, long stalked, rarely borne singly, obovoid or subglobose, inflated, red, with 3 or 4 minute knob-like triangular wings at top corners, 0.8–1(–1.3) × 0.8–1.3 cm, shortly puberulent; wings 0.5–1 × 0.5–3 mm, abruptly narrowing and often forming a slight ridge to upper quarter or half of fruit; persistent sepals to 5 × 2 mm reaching up to a third or quarter of fruit; stalks 5–8 mm long, erect. **Fig. 6 M.**

Northern Territory and north western Queensland: common on Barkly Tableland; on rocky hillsides and outcrops.

Northern Territory: 22 km E Stuart H/way on Borroloola Rd (14° 42'S, 135° 25'E), Jun 1971, *Dunlop* 2179 (NT); 45 km S of Willeroo H.S. (15° 40'S, 131° 41'E), May 1960, *Chippendale* 6874 (NT); Newcastle Creek, Stuart H/way (17° 15'S, 133° 27'E), Mar 1979, *Henshall* 2508 (NT); 10 km NW of Helen Springs, May 1960, *Chippendale* 7006 (NT); Tennant Creek, Apr 1948, *Perry* 621 (NT). **Queensland.** BURKE DISTRICT: Lawn Hill (18° 35'S, 138° 35'E), May 1940, *Jensen* 78; Adels Grove, Camooweal, Mar 1947, *deLastang* 340; Pilpah Hill, 11 km N of Barkly Downs, Oct 1962, *Pedley* 1082; Barkly Downs, 80 km SE of Camooweal, Dec 1947, *Everist* 3386; Mt Isa about 45 km NW on Barkly H/way, Sep 1974, *Ollenschaw, Kraatzing & Telford* 1259; Between Mt Isa-Gun Powder, Jan 1978, *Althofer* 8525.

The species resemble *D. hispidulus* var. *aridus* in having fruits with tiny wings but the wings in the new species are almost rudimentary, rarely continuing beyond middle of fruit; stamens also fewer and sepals wider.

3. *Distichostemon dodecandrus* Domin, *Biblioth. Bot.* 89:914 (1927). **Type:** Queensland. North Kennedy District: Mt Remarkable Pentland, *Domin* (PR, holo).

Small decumbent shrubs 0.5–1 m high with \pm rigid branches; young parts pubescent or puberulent; branchlets with spreading often curved white hairs, pubescent to glabrous. Leaves obovate or obovate-elliptic, tips broad obtuse, rounded, truncate, apiculate, margins entire, bases cuneate or obtuse, 1–4.2 \times 0.6–1.7 cm, puberulous or pubescent especially below, or glabrous, surfaces thick and usually soft in hairy forms, scabridulous in less hairy ones, \pm viscid; lateral nerves 4–8 pairs, obliquely arched, distinct; petioles slender, semiterete, 1–5 mm long. Inflorescences axillary or at tips of branchlets, lax, open, racemose, 3–12 flowered, or female or bisexual flowers often solitary on long stalks or in 3-flowered cymes; peduncles pubescent or puberulent. Flowers 5–7 mm (males), 7–9 mm diam. (females and bisexual); pedicels 6–12 mm long (longer in females, elongating to 40–50(–85) mm in fruit), filiform, graceful; sepals 6–10, linear ovate-oblong or elliptic-ovate, obtuse or acute, 2–5 \times 1–2 mm, often with distinct midrib, puberulous; stamens 10–15, glabrous (hairy in young ones), filaments 1–3.5 mm long, anthers 2.5–3.5 mm long, pilose or glabrous; ovary obovoid, pubescent; style 5–12 mm long. Capsule 3-lobed; usually solitary on a long slender stalk or 2–4 together in lax racemose infructescences, obtriangular or suborbicular-obovoid, winged slightly above middle, inflated, 0.8–1.6 \times 1–2.2 cm, pubescent; wings 3–8 \times 4–6 mm, broadly ovoid, or obtusely triangular, often narrowing and decreasing more towards base of fruit than at apex, herbaceous. **Fig. 6 A, B.**

Queensland: from near Mareeba to north of Clermont, common on yellow or red brown sandy, pebbly soils on hillsides.

COOK DISTRICT: Granite Gorge, on Granite Ck ca 9.5 km SW of Mareeba, Jul 1979, *Clarkson* 2479; Stannary Hills area ca 7 km S of Mutchilba on road to Stannary Hills settlement, Aug 1979, *Clarkson & Byrnes* 2506; Dimbulah-Petford Rd ca 21 km NE of Petford, Feb 1980, *Clarkson* 2757. NORTH KENNEDY DISTRICT: Sleepers Log Ck, N of Townsville (19° 10'S, 146° 30'E), Apr 1975, *Craven* 3173; Charters Towers ca 24 km SW on Flinders H/way, Jul 1974, *Ollerenshaw* 1089; 10 km NE of Valley of Lagoons H.S., Upper Burdekin River, May 1971, *Blaxell* 506; SW of Woodhouse, Jun 1949, *Smith* 4380. SOUTH KENNEDY DISTRICT: Charters Towers-Clermont Rd about 226 km from Charters Towers, May 1960, *Johnson* 1904 & 1905. MITCHELL DISTRICT: Middle Hills, 10 km E of Torrens Creek, in 1981, *Rebgetz* 505; 17 km E of Torrens Creek (20° 44'S, 145° 11'E), Jul 1975, *Chapman* 1366.

The long pedunculate often solitary capsules with \pm triangular wings, the rigid branches and small leaves, and few stamens easily distinguishes the species.

4. *Distichostemon malvaceus* Domin, *Biblioth. Bot.* 89:913 (1927). **Types:** Queensland: Cook District: Palmer River, 10 Aug 1873, *W. Hann* 60 & 27 (K, syn).

Misapplied name: *D. phyllopterus* auct non F. Muell., Britten in Banks & Solander, *Bot. Cooks Voy.* 1:17, t.44 (1900); Benth., *Fl. Aust.* 1:487 (1862) p.p. quoad Banksian specimens.

Shrubs 0.4–1.5 m; usually scabridulous with pale hispid hairs, young parts densely pubescent with pale yellow hairs; branchlets with spreading curved, \pm antrorse hairs. Leaves oblong, elliptic or obovate, apices broad obtuse, truncate, retuse or apiculate, margins entire, subentire or crenulate, bases subtruncate, obtuse or subacute and decurrent, 5.5–9 \times 1–2.3 cm, puberulent or pubescent especially on lower surfaces, scabrous or scabridulous; midribs pubescent, lateral nerves 5–11 pairs, fine, irregular, usually drying white and distinct above; petioles 1–2(–5) mm long, slender, pubescent. Inflorescences terminal or in upper axils, open racemes 2.5–7.5 cm long, 2–7(–13)-flowered; or flowers solitary on slender stalks; peduncles densely pubescent. Flowers 7–9 mm diam.; pedicels to 4 mm long; sepals 5–7, linear ovate-oblong, acute or acuminate, usually with distinct midrib, 3.5–5 \times 1–1.8 mm, puberulent, \pm viscid; stamens 8–10, filaments 3.5–5 mm long, filiform, glabrous, anthers linear ovate-oblong, falcate, 2.5–4 mm long, puberulent; ovary subobcordate, (4–)6–8-lobed, white pubescent, styles 2.5 mm long. Capsules (4–)6–8-lobed; green tinged with red or greenish yellow, solitary on long stalks or 2–5 together in racemose infructescences, ellipsoid, broad, rounded on top, dorsally winged nearly the whole length (apex and base remaining wingless), 1.5–2.2 \times 1.2–2.2 cm, submembranous, inflated, hispid pubescent with long (villose) hairs and short hairs; wings narrow, wider towards apex (to 3 mm wide) tapering to base, herbaceous; stalks 1.2–6 cm long, erect or drooping. **Fig. 6 J, K.**

Northern Queensland: Pascoe River, Cape York Peninsula, to near Mareeba, in open forests usually on dry sandy and gravelly ridges.

COOK DISTRICT: Browns Ck, Pascoe River (12° 40'S, 143° 0'E), Jun 1948, *Brass* 19175, Jul 1948 *Brass* 19572; Kennedy Rd, Tozer's Gap, Aug 1965, *Gillins* 1084; 8.7 km from Kennedy R on Jedda Ck track to King River Station (15° 40'S, 143° 50'E), Jun 1981, *Clarkson* 3706; Split Rock to Gugu Yelandji, S of Lakeland Downs-Laura Rd., May 1975, *Byrnes* 3378; Giant Horse Gallery, Laura (15° 40'S, 144° 30'E), May 1975, *Hyland* 8112; Endeavour River, Dec 1977, *Scarth-Johnson*; Mt Molloy, Apr 1932, *Brass* 2467; near Mareeba, Feb 1962, *Webb & Tracey* 5907.

This species can be distinguished by its (5-)6-8-lobed fruits with narrow dorsal wings continuing from apex to base of the lobes of the fruit. Some 4-lobed fruits do occur (e.g. *Webb & Tracey* 5907 and *Brass* 19175). Leaves of these collections are also narrower.

5. *Distichostemon arnhemicus* S. T. Reynolds, species nova a speciebus aliis capsularis late alatis 4-5-lobatis foliis saepe majoribus et longioribus et petioli longiuscule distingeunda.
Typus: Northern Territory. Mt Brockman (12° 44'S, 132° 54'E), 21 Feb 1973, *C. Dunlop* 3322 (BRI, holo; NT, iso).

Small shrubs to 3.5 m; young parts pubescent; branchlets with long pale ± antrorse spreading hairs. Leaves usually long and oblong, rounded at apex, abruptly obtuse at base, or elliptic, obtuse at both ends, rarely obovate attenuate at base, margins entire, (3-)5-14.5 × (1.2-)2-4.2 cm, surfaces soft, puberulous above, pubescent especially on nerves below, midribs pubescent; lateral nerves 9-20 pairs, slender, subpatent ± looping at margins, raised below, often slightly impressed above; petioles slender and long, terete, 4-15 mm long, pubescent. Inflorescences terminal, lax open racemes, 6-11 cm long, 5-13-flowered, or lower flowers of some in 3-flowered cymes, or flowers in pairs or female flowers solitary; peduncles slender, pubescent with ± curved hairs; bracts linear or subulate 3-5 mm long. Flowers 8-12 mm diam., males often larger; pedicels 4-21 mm long (8-25 mm long in fruit), slender, drooping; sepals 6 or 7, as long as or longer than stamens, ovate-oblong, acuminate, 3-5 × 1.2-1.7 mm, midrib distinct, puberulous outside with long hairs, inside with fine appressed hairs, usually persistent; stamens 14-24, filaments usually shorter than anthers, 1-3 mm long; anthers 3.5-4 mm long; ovary obcordate 4- or 5-lobed, densely pubescent; style glabrous 1-3.5 mm long. Capsule 4- or 5-lobed; usually 4-7 together in a compact bunch or borne singly, depressed obovoid (suborbicular when young with flat rounded lobes and wings), winged broadly from apex to base, 0.8-1.8 × 1.7-2.5 cm; densely villose appressed hairy (young fruits sericeous); seed-bearing portion orbicular or ellipsoid; wings usually wider at apex (6-8.5 mm wide) gradually narrowing from the middle to the base (3-4.5 mm wide at base); sepals to 5 × 2.5 mm. **Fig. 6 L.**

Northern Territory: common in mineralised areas of Arnhem Land, in sandstone gullies, gorges and escarpments, often near creeks.

Northern Territory: Gove Mining area (12° 20'S, 136° 45'E), Jun 1974, *Hinz* 7466 (NT); Tin Camp Creek about 32 km S of Nabarlek Mining Camp (12° 28'S, 133° 15'E), May 1973, *Hartley* 13831 (NT); about 11.4 km W of Mt Gilruth (12° 57'S, 137° 54'E), Mar 1973, *Lazarides* 7953 (BRI, NT); Mt Basedow Ra (12° 59'S, 132° 41'E), Jun 1973, *Hartley* 13881 (NT); 6.4 km NW El Sharana-Pine Ck Rd (13° 29'S, 132° 31'E), Jan 1973, *Martensz & Schodde* AE413 (NT); Katherine Gorge (14° 18'S, 132° 28'E), Mar 1964, *Lazarides* 7032 (NT).

The new species is distinguished from all the other species by its broadly winged 4-5-lobed capsules, its leaves often larger and longer and with moderately long slender petioles.

6. *Distichostemon hispidulus* (Endl.) Baillon, Nat. Hist. Pl. 5:411 (1878); Radlk., in Engler Pflanzenr. 98 h:1405 (1934). Based on *Dodonaea hispidula* Endl., Atacta Bot. t.30 (1833).
Type: Illustration by Bauer (probably from specimen collected by Robert Brown at Gulf of Carpentaria. Specimen not seen)

Distichostemon phyllopterus F. Muell., in Hook. J. Bot. Kew Gard. Misc. 9:306 (1857); Benth., Fl. Aust. 1:487 (1863); F. M. Bailey, Qd Fl. 1:319 (1899). **Type:** Victoria River, F. Mueller (MEL, lectotypus novus).

Shrubs to 2 m; young parts pubescent; branchlet, leaves, peduncles pubescent or puberulent with hispid spreading hairs. Leaves usually clustered on branchlets, narrowly elliptic, subobovate or elliptic-oblong, apex obtuse, truncate, mucronate or retuse, margins entire or crenulate, base obtuse, subacute or acute decurrent into petioles 1.5-9 × 0.8-3.4 cm, thinly coriaceous, surfaces smooth or coarse, puberulent or pubescent, occasionally scabrellus; lateral nerves subpatent or oblique, ascending at tips; petioles slender 0.2-1.4 cm long, pubescent. Inflorescences terminal or

axillary, laxly flowered open racemes, or racemiform with basal flowers in 2- or 3-flowered cymules or \pm paniculate with 1 or 2 branches or female flowers solitary. Flowers 5–14 mm diam.; pedicels 2–22 mm long; sepals 5–10, usually as long as stamens, elliptic, acute, pubescent or puberulent, usually persistent; stamens 33–74, filaments shorter or as long as anthers; ovary obovoid or obcordate, truncate or 3- or 4-lobed at apex, pubescent; style 5–25 mm long. Capsule usually in racemose infructescences, oblong-obovoid or ellipsoid, winged from apex to base with wings wider at apex narrowing gradually to base or winged only towards top with erect or divaricate long narrow wings, narrowing and forming a ridge usually to base of fruit, finely pubescent or puberulent.

Western Australia, Northern Territory and north western Queensland in sandy soil along coast or on sandstone.

Very variable consisting of at least three distinct taxa, but since the extreme forms occasionally merge into each other they are treated here as varieties.

6a. *D. hispidulus* var. *hispidulus*

Distinguishing characters are set out in the key. (p.58)

Shrubs 1–1.5 m; usually grey green, spreading; young parts and branchlets pale yellow pubescent. Leaves usually clustered on branchlets, mostly small, narrowly elliptic or subobovate or elliptic-obovate, apex obtuse, subtruncate, retuse or mucronate, margins entire or \pm crenulate; bases usually subacute and decurrent into petioles or obtuse, 1.8–6.8 \times 0.8–2.4 cm, thick and soft with both surfaces pubescent or puberulent, or surfaces sometimes thin and \pm scabrelous above; lateral nerves 5–12 pairs, oblique, ascending, raised below, reticulation fine; petioles 3–9 mm long, slender, pubescent. Inflorescences subterminal usually open racemes, or paniculate 1 or 2 branched, or only the basal flowers in 3-flowered cymules, 1.5–7.5 cm long, 3–19-flowered, peduncles slender, pubescent; bracts subulate 2–5 mm long. Flowers 6–8 mm diam.; pedicel 3–10 mm long (shorter in males), usually very slender, fragile; sepals 5–10, usually as long as stamens, elliptic, acute, 2.5–3.5 \times 1–1.5 mm, puberulent, thin, persistent; stamens 33–74, filaments 2–2.5 mm long, anthers 2–5 mm long, usually pale yellow with a red groove; ovary obovoid or obcordate, blunt, or 3-(or 4)-lobed at apex, pubescent; style 1.5–2.5 cm long. Capsule 3-(or 4)-lobed, usually borne in racemose infructescences, oblong-obovoid or subglobose, 0.8–1.2 \times 1.5–1.8 cm, winged from apex to base, wings \pm triangular, 5–7 \times 4–8 mm, broader at upper third of fruit, narrowing from about below middle and usually forming a ridge to base of fruit, pubescent or puberulent. Young fruits mostly obovoid, triquetrous. **Fig. 6E.**

Northern Australia: Western Australia, Northern Territory and north-western Queensland, on undulating sand plains on red lateritic soil.

Northern Territory: Little Lagoon Groote Eylandt, Apr 1948, *Specht* 244; Seigal Ck., S of Calvert Hill Stn., May 1973, *Henry* 756; Maranboy Police Stn., May 1960, *Chippendale* 6627; 6746 (NT); Borooloola Stn., Jul 1948, *Perry* 1764; Settlement, Ck, Jun 1922, *Brass*. **Queensland:** COOK DISTRICT: Gilbert River, *Bick*. BURKE DISTRICT: Sweers Is., Jun 1901, *Bailey*; Mornington I., May 1963, *Tindale*; Turnoff Lagoon and Woollogorang, May 1940, *Jensen* 53; E of Westmoreland about 48 km E of Qld NT border, May 1974, *Pullen* 9180; 16 km [10 mls] W of Westmoreland Stn., Jun 1948, *Perry* 1155.

Mueller's collection from Roper River (Benth. l.c. 487) and Schultz's from Port Darwin (Raldkofer l.c. 1405) probably belong here (K photographs).

6b. *D. hispidulus* var. *phyllopterus* (F. Muell.) S. T. Reynolds, var. et comb. nov. Based on *D. phyllopterus* F. Muell., l.c. 306 (1857). **Type:** Victoria River, *F. Mueller* (MEL 101393, lectotype designated here); Point Pearce, *F. Mueller* (K, lectoparatype).

Distinguishing characters are set out in the key. (p.58)

Shrubs 0.6–2 m; often straggly; young parts pubescent, branchlets and leaves with long and short, usually hispid hairs. Leaves obovate or elliptic-oblong, apex subtruncate, broadly obtuse, subretuse or mucronate, margins entire or crenulate, base obtuse or subacute, 2–9.2 \times 1–3.4 cm, thinly coriaceous, surfaces soft or coarse, puberulent or pubescent, midribs pubescent; nerves and reticulation distinct, lateral nerves 5–11 pairs, subpatent, ascending at tips; petioles 4–14 mm long, subterete. Inflorescences terminal or axillary, 5–8.5 cm long, 5–23-flowered, racemose or \pm paniculate with 1 or 2 branches at base, cymules 2- or 3-flowered, or female flowers solitary;

peduncles puberulent or pubescent; bracts subulate to 5 mm long. Flowers 8–14 mm diam.; pedicels 2–22 mm long, usually long and drooping in males, stout and erect in females; sepals 6–8, narrowly elliptic or linear oblong 3–6 × 1–2 mm, puberulent or pubescent, usually persistent; stamens 30–52, filaments 1.5–3.5 mm long, anthers 2.5–3 mm long; ovary obovoid or obcordate, 3- or 4-lobed at apex, pubescent; style 5–10(–18) mm long. Capsules 3- (or 4)-lobed, either borne in racemose infructescence or solitary on stout erect stalk, depressed obovoid, winged broadly towards upper third narrowing and forming a fine ridge to base of fruit, 0.8–1 × 1.2–2.8 cm; wings 4–7 × 5–14 mm, herbaceous, divaricate, long and narrow, wider than long, or erect and obtusely triangular; seed bearing portion obovoid or oblongoid, inflated, finely puberulent with long and short white or pale yellow ± appressed hairs. **Fig. 6 F, G, H.**

Western Australia and Northern Territory: from the Kimberleys and offshore islands Western Australia to McArthur River, Northern Territory; on sandstone and sandy rocky areas.

Western Australia: Bougainville Peninsula, NW Kimberley (13° 54'S, 126° 04'E), Sep 1978, *Beard* 8266, 8271 (PERTH); Surveyors Pool, Mitchell Plateau NW Kimberley (14° 41'S, 125° 43'E), Jun 1976, *Kenneally* 5066 (PERTH), near Junction of Drysdale R. and Mogunda Ck, Drysdale R. Nat. Park (± 15° 02'S, 126° 55'E), Aug 1975, *George* 13500 (PERTH); S end of Asthon Ra near Domains Ck, Drysdale R. Nat. Park (15° 16'S, 126° 43'E), Aug 1975, *George* 13310 (PERTH); Byam Martin Is., Bonaparte Archipelago (15° 24'S, 124° 22'E), Jul 1973, *Wilson* (PERTH); Prince Regent R. Res. (15° 32'S, 125° 13'E), Aug 1974, *George* 12591 (PERTH); Bat Is. (15° 55'S, 124° 54'E), Jun 1973, *Wilson* 10982 (PERTH); Broome, Cable Beach area (17° 56'S, 122° 13'E), May 1971, *Maconochie* 1173 (NT, PERTH); Plain Ck ± 10 Km W of Beverley Springs H.S., Aug 1974, *George* 12216 (PERTH); Packsaddle Ck (15° 56'S, 128° 40'E), northern Carr Boyd Ranges, Mar 1978, *Haritley* 14386 (NT); Thompson Springs, 67 km [42 mls] SE of Kimberley Res Stn., Jul 1952, *Perry* 2947 (BRI, NT); Dam Site, Ord River, Argyle Stn., Jun 1944, *Gardner* 7369 (PERTH); Durack River (15° 40'S, 127° 31'E), May 1967, *Maconochie* 181 (NT). **Northern Territory:** Keep River (15° 47'S, 129° 02'E), Sep 1975, *Mitchell* 327 (NT); Cox River Stn., Jul 1977, *Henshall* 1635 (NT); Buchanan Bay (15° 40'S, 136° 44'E), May 1977, *McKey* 94 & 95 (NT).

The texture and hairiness of leaves and shape of the wings of the capsules are quite variable, e.g. collections from around Kununurra (Carr Boyd Ranges, Thompson's Springs and Ord River Dam) have thinner and finer leaves with definite crenulations on margins, and the wings of the capsules are divaricate, wider than long, while those from north west Kimberleys, especially from offshore islands have rather thick and coarser leaves and the wings of the capsules are usually erect or slightly divaricate and the tips are often blunter.

6c. D. hispidulus var. *aridus* S. T. Reynolds, varietas nova differt var. *hispidulo* alata et plerumque fructibus parvioribus, alis parvulis angustatis *D. barklyano* accendens. **Typus:** Northern Territory: Hayfield Station (16° 38'S, 133° 17'E), Jan 1978, *T. S. Henshall* 1907 (BRI, holo; NT, iso).

Distinguishing characters are set out in the key.

Small spreading shrubs 0.7–1 m; branchlets, leaves and young parts pubescent. Leaves often clustered, narrowly elliptic or subobovate, apex obtuse, retuse, mucronate, margins entire or subcrenulate; base acute decurrent into petioles, 1.5–4(–6) × 0.4–1.2(–1.8) cm, surfaces usually thick, puberulous above, pubescent below; lateral nerves 6–9 pairs, slender, pale, arched and ascending, prominent below; reticulate venation usually indistinct; petioles 2–6 mm long, slender, pubescent. Inflorescences racemose, 5–7 cm long to 10-flowered with basal flowers in 2- or 3-flowered cymes or female flowers solitary, axillary or terminal. Flowers 5–9 mm diam., pedicel 2–6 mm long, slender; bracts subulate 4 mm long; sepals 6 or 7, as long as stamens, elliptic with distinct midrib, 4 × 1–2 mm, puberulous, usually persistent; stamens 31–74, filaments 1 mm long, anthers 2 mm long; ovary obovoid or ellipsoid, with 3 or 4 small flat wings towards apex, 0.8–1(–1.2) × 0.6–1(–1.5) cm; wings ± triangular, obtuse, 2–7 × 2–4 mm, broad at apex till about upper quarter, abruptly narrowing and forming a narrow ridge to near base of fruit or often only till below middle of fruit. **Fig. 6 I.**

Western Australia and Northern Territory; usually on sand plains and on sandstone.

Western Australia: Glenelg River Gorge, Jul 1950, *Gardner* 9665 (PERTH); Plane Ck, near Beverley Springs H.S., N of Derby, Aug 1974, *Kenneally* 1987 (PERTH); Goody Goody, Apr 1905, *Fitzgerald* 209 (PERTH), Kimberley Downs, Apr 1953, *Gardner* (PERTH); 26 mls [42 km] E of Langley Bridge, Fitzroy River (17° 42'S, 123° 58'E), May 1967, *Maconochie* 261 (NT). **Northern Territory:** Suple Jack Stn., 19 km NW of H.S. (19° 10'S, 129° 49'E), Oct 1978, *Henshall* 2373 (NT).

This variety differs from var. *hispidulus* in having very small wings and usually smaller fruits. The very small narrow wings approach those of some plants referred to *D. barklyanus*.



Fig. 6. *DISTICHOSTEMON*. *D. dodecandrus*: A. habit, showing flowers & fruit (Clarkson 2757) $\times 1$. B. flower (Clarkson 2757) $\times 1$. *D. filamentosus*: C. habit with fruit (Lazarides 7891) $\times 1$. D. flower (Parker 155) $\times 3$. *D. hispidulus* var. *hispidulus*: E. fruit (Perry 1764) $\times 1$. *D. hispidulus* var. *phyllopterus*: F. habit. G & H. fruit (all Wilson 10982) all $\times 1$. *D. hispidulus* var. *aridus*: I. fruit (Henschall 1907) $\times 1$. *D. malvaceus*: J. habit, with flowers (Webb & Tracey 5907) $\times 1$. K. fruit (Clarkson 3706) $\times 1$. *D. arhemicus*: L. fruit (Dunlop 3322) $\times 1$. *D. barklyanus*: M. fruit (Must 472) $\times 1$.